The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. X. No. 260 JUNE 7, 1924 Prepaid Annual Subscription United Kingdom, £1.1.0; Abroad, £1.4.0.

Contents

NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.*

Editorial and General Offices—8, *Bouverie St., London, E.C.4.*
Telegrams : "Allangas, Fleet, London." Telephone : City 9852 (6 lines)

Examinations in Alkali Manufacture

ELSEWHERE the questions set at the recent Alkali Manufacture Examinations, held under the auspices of the City and Guilds of London Institute, are published. We learn with real regret that the number of candidates presenting themselves for the examinations this year does not reach double figures. This is in marked contrast to the number of candidates who sit for the examinations in gas engineering and other technological subjects. In past years several hundreds of candidates have presented themselves for the examinations in gas engineering and gas supply. Why there should be such indifference in the matter of the alkali manufacture examinations is a question which certainly merits consideration. If elementary and final grade certificates in gas engineering and gas supply are of value to the technical employees of the various gas undertakings throughout the country, surely similar certificates of competency should be of value to the technical staffs engaged by heavy chemical manufacturing firms. It is not imagined that the absence of interest or enthusiasm is attributable to any one party. There is, however, ground for the belief that if heavy chemical manufacturing firms made it known that they attached importance to the possession by their staffs of the alkali manufacture certificates, the persons constituting such staffs would see to it that the technical colleges or schools throughout the country provided the necessary classes for tuition in alkali manufacture. On the other hand, it is not unreasonable to suppose that if the junior members of the staffs of such firms were ambitious, they would express to the authorities of the technical colleges or schools a wish for classes in alkali manufacture, and undoubtedly such a wish would be met without demur.

An examination of the syllabus relating to alkali manufacture reveals that it is comprehensive and covers a larger variety of processes than most heavy chemical manufacturing firms can possibly hope to embrace. The possession of technical knowledge concerning the salient features of the various manufacturing processes contemplated by the syllabus cannot but be of utility and value, not alone to those possessing the knowledge, but to those firms with which they are associated. In order to develop interest in this subject, it is proposed in a subsequent issue to publish what is hoped will prove to be model answers by experts to the questions which are given elsewhere. In this way, it is to be hoped, fresh interest will be evinced in the examinations under notice, for they certainly deserve better attention from the classes they are specially designed to benefit.

Recovery of Hydrocyanic Acid

IN reference to gas-producing methods it will not be without interest to mention a point which was raised a day or two ago when an overseas visitor was discussing with us the methods applicable for the recovery in a commercial form of the hydrocyanic acid which is yielded from the carbonisation of coal. Our visitor was anxious to obtain information as to the most practicable means for effecting recovery, but he was met with the difficulty that so few undertakings in this country are of sufficient magnitude as to warrant the adoption of a process which admittedly does not leave much margin for profit. During the past twenty-five years or so many processes have been installed on a technical scale, but the majority of them have introduced complications both as regards *rationale* and products employed which render them of doubtful merit from both practical and commercial standpoints. Little detailed information has been published as regards the respective merits of the available processes, but probably none of our readers will quarrel with us if we say that undoubtedly the process par excellence is the Williams polysulphide method which was introduced, we believe, some ten years ago. This method relies on the simple principle that hydrocyanic acid, while unable to react with ammonium sulphide, is capable of forming a sulphocyanide when meeting with ammonium polysulphide. In practice, the polysulphide solution is produced in extraordinarily simple fashion by percolating ordinary ammoniacal liquor

(largely ammonium sulphide) through spent oxide of iron containing free sulphur, the resulting product being ammonium sulphocyanide which may, if desired, be subsequently transformed, by boiling with lime, into the calcium salt. Should there be others of our readers who are interested in the details of what is a most fascinating yet simple process we might remind them that a full description was given in one of the earliest numbers of THE CHEMICAL AGE (Vol. I, No. IV, July 12, 1919), and the rights of the process are, we believe, held by the British Cyanides Company.

The Billingham Achievement

THE recent announcement by Mr. Roscoe Brunner at the annual meeting of Brunner, Mond and Co., of the successful commercial production of synthetic ammonia at Billingham-on-Tees by the subsidiary company, Synthetic Ammonia and Nitrates, Ltd., is a distinct landmark in the progress of the British chemical industry. Actually the large-scale plant, capable of producing 100 to 120 tons of dry neutral sulphate of ammonia, was brought into operation on Christmas Day, 1923, and has been working continuously ever since.

The beginnings of what is really a great achievement of national importance had their root in the proposal, made during the war in 1917, that it would be well, in view of the submarine menace and the possibility of the restriction of essential supplies of Chilean nitrate, to investigate the possibilities of producing synthetic nitrogen products in this country. Research was undertaken by the Nitrogen Products Committee and a large site secured at Billingham, near Stockton-on-Tees. At the end of the war arrangements were made to transfer the site and the results of the experiments to Brunner, Mond and Co., who continued the experimental work at Runcorn in the works of the associated company, Castner-Kellner, Ltd. Meanwhile the work of erecting the factory and the plant was proceeded with at Billingham, resulting eventually in the commercial production of synthetic ammonia, which is at present almost entirely converted to sulphate.

It must be remembered that no one in this country had had any experience of the commercial production of synthetic ammonia, and the whole of the details of the commercial plant have had to be worked out from the scanty information available. It was rather an accident of the war than any other reason which led in the first instance to the choice of the Haber process, but in the course of its practical development so many modifications have been introduced that the present method may be justly described as the Brunner-Mond or Billingham process. Of course, at the moment nothing is disclosed as to the distinguishing features which characterise the process, such as the essential points of temperature and pressure. One result of the lack of any experience in this country with work of this kind is that the staff of such a plant must obviously be trained for the work, and these presumably would be selected from various works. It is understood that those who have seen the works at Billingham are struck by the degree to which automatic control has been successfully applied. The operation—flow of materials, temperatures and so on—are all, as far as possible, controlled automatically, the whole plant has been designed on the most modern lines, and a notable result is an almost complete absence of the dirt and noise so frequently accompanying chemical manufacture.

It is not possible at the moment to give any details of the process, but it is understood that developments are still continuing and designs are in hand for increasing the size of the plant to produce 300 tons of sulphate daily, and after that it is hoped not only to produce ammonium nitrate but also urea which is the most concentrated form of nitrogenous fertiliser that can be obtained. We understand that the sulphate of ammonia is not being sold direct but is turned over to the British Sulphate of Ammonia Federation. It is now available in most of the markets of the world, and it has received much favourable comment owing to its extremely dry and neutral qualities. Incidentally in point of purity the synthetic product must obviously be equivalent to that yielded by the more common methods.

A Comparison of Dyestuff Imports

THE comparative statements of dyestuff imports for the years 1913 and 1923, given in the House of Commons this week, though the figures are not in a strictly comparable form, strikingly illustrate the change which has taken place within the last ten years. Last year the total import of coal tar intermediates amounted to only 1,249 cwts. As regards finished coal tar dyestuffs we imported 8,409 cwts. of alizarine, 8,274 cwts. of synthetic indigo, and 39,474 cwts. of other sorts. The intermediates came mainly from the United States and the finished dyestuffs almost entirely from Germany. The total imports for 1923 amount to only 57,406 cwts.

The contrast with the position in 1913 is impressive. The figures for imported intermediates for that year are not given, for the reason probably that we made but little use of them, preferring to buy the finished dyestuffs. Of the latter we imported 60,813 cwts. of alizarine and anthracene dyestuffs, 283,027 cwts. of aniline and naphthalene dyestuffs, 23,889 cwts. of synthetic indigo, and 155 cwts. of other coal tar dyestuffs. The dyestuff imports for 1913 thus total 367,884 cwts., of which the immense proportion of 342,979 cwts. came from Germany. Last year, as stated, the total imports of intermediates and finished dyestuffs only came to 57,406 cwts., of which Germany supplied 41,918 cwts. These figures, published in detail in our Parliamentary news, give in the most concrete and conclusive form the history of the British dyestuff industry for the past decade.

Housing Scheme Costs

IN introducing his housing proposals on Tuesday, the Minister of Health has given to the nation an exercise in the higher branches of arithmetic, the strain of which it is doubtful how far we shall be able to stand. Mr. Wheatley puts forward the pleasing proposition that whereas land, labour, and materials for a house cost together only 3s. 3d. a week, finance, the bugbear

of the socialist, imposes a charge upon each house of 6s. 8d. a week. That a Minister of State should put before the electorate as a whole, which now includes girls of 21, a statement of this kind opens up interesting possibilities. If they accept it, the world of finance and credit as we know it is gone. If they analyse it and understand it, the standard of education will undergo a very rapid rise.

To expose the fallacy of Mr. Wheatley's method of calculation it is only necessary to apply it to ordinary business practice. For example, a young man paying a first premium of £12 or £15 for a full life policy of £1,000, would on the Wheatley plan be able to claim on making his first payment that he then and there possessed the sum of £1,000. A tradesman finding it inconvenient to meet a bill for £100 would be able to get a clean discharge for his debt on putting down the first instalment at the rate of 2s. a week. The youth coveting a £50 motor cycle could claim it from the supplier on production of 1s. a week; or the householder requiring £5 worth of goods could order them to be delivered and tell the tradesman to call for his 2d. a week. Why cannot these things be done? Subsequent debates in the House will have to enlighten us.

The Kelvin Centenary

To commemorate the centenary of the birth of Kelvin, several interesting functions have been arranged by the Kelvin Centenary Committee for July 10 and 11. On the afternoon of the first day, at the Institution of Civil Engineers, Great George Street, Westminster, the presentation of the Kelvin Medal will be made to Dr. Elihu Thomson (U.S.A.), Sir Charles Morgan, President of the Institution, being in the chair. This will be followed immediately by the reception of written addresses from the scientific societies of the British Dominions and foreign countries. The Kelvin Oration will then be delivered (about five o'clock) by Sir J. J. Thomson. Sir Richard Glazebrook will preside at the reception of addresses and the Kelvin Oration. In the same building there will be available for the inspection of visitors an exhibit of Kelvin experimental apparatus which has been collected by the committee specially for this commemoration. These exhibits will be on view from July 8.

An important feature of the celebrations will be a banquet to take place on the evening of Friday, July 11, at the Connaught Rooms, Great Queen Street, London. The Earl of Balfour will preside. Many distinguished scientists and engineers, among them delegates from the societies of Great Britain and the Dominions, as well as the Continent of Europe and the United States, have already indicated their intention to be present. Tickets for the dinner, the price of which is two guineas inclusive, will be issued in order of priority of application, the seating accommodation being limited. Those who wish to attend the banquet are invited to send in their applications for tickets, with their names and addresses, together with the names of their proposed guests, to Mr. D. N. Dunlop, hon. secretary of the Kelvin Centenary Committee, 61 and 62, Lincoln's Inn Fields, London, W.C.2, to whom crossed cheques for the amount of the tickets may be made payable.

Chemical Section Ground Plan

In response to many requests from readers we are issuing this week as a supplement to the Chemical Age our specially drawn ground plan of the Chemical Section exhibits at the Wembley Exhibition, showing the numbers and position of the stands and the name of the exhibitors. This supplement, printed on art paper, is issued as a loose inset, and a copy should be received by subscribers with every copy of the journal.

Points from Our News Pages

Our Metallurgical Section contains an article by Mr. W. A. C. Neuman on the purification of bauxite.

The major recommendations of Royal Commission on Fertilisers for the prevention of misrepresentation and fraud are published (p. 590.)

Dr. F. W. Aston's May Lecture at the Institute of Metals dealt with Atoms and Isotopes (p. 592.)

Notes of the British Empire Exhibition deal more particularly with a striking addition to the B.D.C. exhibit (p. 595.)

A letter appears protesting against the continued exclusion of German scientists from international scientific bodies (p. 596.)

According to our London Market Report there has been a healthy tendency, though business has been slowing down for the holiday (p. 604.)

Business in the Scottish chemical market has shown some improvement of late (p. 605.)

A new feature appears in our market pages giving prices of various products based on information supplied by various manufacturers (p. 606.)

Books Received

Standard Methods of Testing Petroleum and Its Products. London: The Institution of Petroleum Technologists. Pp. 100. 6s.

Mechanical Refrigeration. By Hal Williams. London: Sir Isaac Pitman and Sons, Ltd. Pp. 502. 20s.

The Calendar

June 11	Faraday Society and the Textile Institute: General Discussion on Physical and Physico-Chemical Problems Relating to Textile Fibres." 2.30 to 6.30 p.m.	Conference Hall No. 4, British Empire Exhibition, Wembley.
11	Society of Dyers' and Colourists' Conference: "An Historical Survey of Dyeing and Calico Printing." J. R. Hannay. 3 p.m.	Conference Hall, British Empire Exhibition, Wembley.
11	Society of Dyers and Colourists: Annual Dinner.	Hotel Victoria, Northumberland Avenue, London, S.W.1.
12	Society of Dyers and Colourists: "Modern Methods of Dyeing." Professor A. G. Green. 11 a.m.	Conference Hall, British Empire Exhibition, Wembley.
12	Chemical Society: Faraday Lecture by Professor R. A. Millikan. "Atomism in Modern Physics." 5.30 p.m.	Royal Institution, Albemarle Street, London, W.1.
12	Optical Society: Papers by Col. L. E. W. van Albada (of Amsterdam) and R. J. Trump. 7.30 p.m.	Imperial College, South Kensington, London.
18	Society of Glass Technology: Meeting.	Sheffield.
19	Chemical Society: Ordinary Meeting. 8 p.m.	Burlington House, Piccadilly, London, W.1.
23–27	Twenty-Seventh Chemists' Exhibition.	Central Hall, Westminster, London.
24	National Physical Laboratory: Annual Visit of Inspection. 3-6 p.m.	Teddington.
July 9	Society of Chemical Industry: Annual General Meeting. Presidential Address by Dr. E. Frankland Armstrong. 11 a.m.	Arts Theatre, The University, Liverpool.

Report of Commission on Fertilisers

Recommendations to Prevent Fraudulent Dealing

The Report of the Departmental Committee on the Fertilisers and Feeding Stuffs Act of 1906 has just been issued (H.M. Stationery Office, Imperial House, Kingsway, London, price 1s.), and contains a number of recommendations which are summarised below. The object of the recommendations is the prevention of fraud, though the Committee point out that on the whole the trade is conducted on just and reasonable lines.

(I.) The bases of civil and criminal procedure should be clearly separated, the invoice remaining the foundation of civil claims and the description applied to the goods becoming that of criminal proceedings.

(II.) The statement in the invoice should be a warranty, as at present, and no statement in the invoice should be held to relieve the seller of his civil liability.

(III.) The period allowed for sampling should be extended to fourteen days after delivery of the goods or receipt of the invoice, and the requirement that notice of sampling be given to the seller should be abolished.

(IV.) No sample other than those defined as " formal " or " informal " should be analysed at the expense of the rates.

(V.) The definitions in the schedules suggested in sub-paragraph (XX.) below should have effect as a warranty.

(VI.) No criminal prosecution for the application of a false description should take place except in respect of a sample taken on the premises of the person to be prosecuted, or in the course of transit in a vehicle into which the consignment is loaded by him or his servants, or in the first conveyance of a public carrier into which it is loaded.

(VII.) In the case of samples taken in transit, it should be necessary to provide conclusive proof that they have been taken in accordance with the Act and Regulations.

(VIII.) Failure to give the statutory invoice should be an offence under the Act in respect of which a prosecution may be commenced by any Local Authority administering the Act without the consent of the Government Department concerned. It should not be necessary to take and analyse a sample before prosecuting for this type of offence.

(IX.) Every parcel of goods to which the criminal provisions of the Act apply should, when prepared for consignment or delivery, be marked in such a way as will indicate to the purchaser the name and address of the consignor and the description of the goods. It should be permissible for the name and address of the consignor to be applied by means of a mark registered with the Government Department concerned, and for the description to take the form of a code sign, of which the index must be displayed for inspection on the premises of the consignor, and a copy deposited with the Ministry or the Board. Failure to apply the description (or code sign) and the name and address of the consignor (or registered mark), or either of them, before consignment should, save in such cases as those referred to on pages 30 and 36, be an offence under the Act.

(X.) A power of entry into all ports, factories, warehouses, stores and shops in which fertilisers or feeding stuffs may be manufactured or stored should be given to authorised inspectors, together with a power to take samples of goods prepared for consignment or delivery, and also a similar power of entry and taking informal samples of any article on the premises when it appears that the analysis of such article may throw light on the question whether fraudulent adulteration has, or has not, taken place on those premises. A power of entry to, and taking samples on, all farms should also be given.

(XI.) Applying a false description to goods prepared for consignment should be an offence under the Act.

(XII.) The presence of a deleterious substance in a feeding stuff or the addition to a feeding stuff of a worthless ingredient the presence of which is not disclosed, should be an offence under the Act. For this purpose, Schedules to the proposed Act should be prepared to show those substances, with regard to which there may be reasonable doubt, which are to be regarded as " worthless " or " deleterious " for this purpose.

(XIII.) Any discrepancy to the prejudice of the purchaser between the description attached to a parcel of goods and the invoice given in respect of it should constitute an offence under the Act.

(XIV.) Where an article is described by a name comprising a name defined in the Schedules, with or without qualifying words, it should be implied that the article consists of that substance only.

(XV.) Prosecutions for the offences set out in paragraphs (IX.), (XI.), (XII.) and (XIII.) should not be instituted by any Local Authority except with the consent of the central Government Department.

(XVI.) No invoice should be required to be given with quantities of goods of not more than half a hundredweight sold from bulk, provided the prescribed particulars are clearly stated on a label attached to the bulk and plainly visible to the purchaser, nor with packeted goods of not more than half a hundredweight if the description appears on the package.

(XVII.) The duty of administering the Act should be imposed by Statute on all County Councils and County Borough Councils in England and Wales, and all County Councils and Burgh Councils in Scotland. Power should be given to Local Authorities to establish joint Committees for the purpose of carrying out the Act, and also to exercise their powers of entry, sampling and prosecution in the area of any other Local Authority with the consent of that Authority. Concurrent powers of entry, sampling and prosecution should be vested in the Ministry of Agriculture and Fisheries and the Board of Agriculture for Scotland.

(XVIII.) Local Authorities should be required to make public, at least half yearly, the results of analyses of all formal samples, together with the name and address of the seller or consignor and the warranty given in each case.

(XIX.) Inspectors under the Act should be senior whole-time officials of the Local Authority. It should be open to the Local Authorities to appoint, in addition to these Inspectors, other Official Samplers for the purpose of taking samples.

(XX.) The scope of the Act should be defined by schedules which should indicate, in respect of fertilisers and feeding stuffs, (*a*) the name of each article or class of article to which the Act should apply ; (*b*) the definition of the substance named ; (*c*) the particulars to be stated in the invoice for the purpose of the civil warranty ; and (*d*) the particulars to be stated in the description for the purpose of the criminal provisions of the Act. Provision should be made for amendment of these Schedules, and also those mentioned in paragraph (XII.) by Regulations made by the Minister and the Board of Agriculture for Scotland, acting jointly.

(XXI.) The defences set out in Section 2 (2) of the Merchandise Marks Act, 1887, should be provided in place of those afforded by the present Act.

(XXII.) It should be provided that no civil proceedings, and no criminal proceedings in respect of the application of a false description, shall be instituted in the case of any sample, unless the results of the analysis of the sample differ from the particulars stated in the invoice or in the description, as the case may be, by more than the amounts prescribed in the " limits of variation."

General Conclusions

There are also a number of minor resolutions for which the report should be consulted.

In concluding their report the Commission wishes to emphasise the fact that, taken as a whole, the trade in fertilisers and feeding stuffs is conducted on just and reasonable lines. As in every other sphere of business, they state, there are individuals and firms who are not above suspicion, and the fact is as well recognised among merchants and manufacturers as among their customers. The vast majority of makers and distributor perceive, also, that they themselves, as honest business men, are doubly hurt by the action of the fradulent minority, in that the reputation of the trade as a whole suffers, while individual firms lose custom to those who are able to attract by misrepresentation. They have, accordingly, not been surprised to find

that the traders have been more than willing to assist in finding some satisfactory method of putting a stop to dishonest or doubtful practices.

The general problem with which they found themselves faced was to frame this method in such a way as to place the greatest possible restriction on fraud without interfering unnecessarily with the freedom of commerce, and those are the two objects they have had in mind throughout their deliberations. They do not pretend that the recommendations, if brought into effect, will result in every case of adulteration or misrepresentation being sifted out and dealt with suitably; that ideal condition is one that can, probably, never be realised. But they do believe that they will have a much greater deterrent effect than anything previously devised, and will constitute a marked advance on the existing provisions. At the same time, although in certain areas, an actual increase in expenditure may be entailed in carrying out their proposals, the Commission is confident that, in relation to efficiency, legislation on the lines suggested will be more economical in its working than is the present Act.

Finally, the Commission desires definitely to associate themselves with the principle laid down by previous Committees —which must lie at the root of all protective legislation—that while compensation for loss or damage, however unintentional, should be the right of every man, the presence or absence of *mens rea* (including culpable negligence) is the fact that should determine whether criminal prosecution is warranted or not. This consideration has been present throughout, and has actuated them in formulating their recommendations; but the value and effectiveness of legislation lies as much in administration as in the letter of the statute, and they, accordingly, venture to express the hope and belief that the Government Departments and local authorities, whose duty it may be to carry out this side of the work, will approach their task in the same spirit.

The Institute of Physics

At the annual general meeting held on Monday, May 26, Sir Charles A. Parsons, F.R.S., was re-elected president. The vice-presidents are Professor W. H. Eccles, F.R.S., Mr. C. C. Paterson, Dr. E. H. Rayner, and Sir Napier Shaw, F.R.S. Sir Robert Hadfield, F.R.S., is treasurer, and Professor Alfred W. Porter, F.R.S., honorary secretary.

From the annual report it appears that the demand for highly trained and qualified physicists at present exceeds the supply. The report deals at some length with the new monthly *Journal of Scientific Instruments* which is being produced by the Institute and edited at the National Physical Laboratory. It also refers to the lectures on "Physics in Industry" which are being delivered under the auspices of the Institute, and a second volume of which will shortly be published by the Oxford University Press. It is believed that the publication of these lectures and their circulation among manufacturers will do much to promote one of the main objects of the Institute, which is to urge the importance of physics in industry and to encourage the employment of physicists qualified to understand where and how physical principles and knowledge may be utilised in increasing the efficiency of existing processes, and in the development of new applications.

Condensation on Concrete

Mr. J. H. Kerner-Greenwood states in a letter to *The Times* that some years ago he spent a considerable amount of time and money in research, and ultimately succeeded in preventing condensation on the interiors of concrete walls by a very simple method. It was nothing more or less than placing a finishing coat of an absorbent mortar on the top of the non-absorbent concrete. He found the best finishing coat was a mixture of three parts of lime putty, run from Buxton or other pure chalk lime, six parts of washed sand, one part of plaster of paris (this to be added at the time of using). This has been well tested in many cottages and other buildings, and he states has never failed to prevent condensation. Six months must be allowed to elapse before wallpaper is applied, to enable the free alkali in the lime to become eliminated, otherwise the paper will be discoloured. However, the walls may be decorated at once with a porous water-paint or distemper.

Alkali Manufacture Examinations

A Practical Scheme of Technical Studies

Below we give details of the questions set by Mr. P. Parrish, A.I.C., M.I.Chem.E., at the recent final examination in alkali manufacture in connection with the City and Guilds of London Institute. The number of students, as pointed out in our editorial notes, is disappointing, and in view of the importance of the subject it is hoped that steps will be taken to excite greater interest in these examinations :—

Final Examination.

1. Name the various grades of pyrites. What qualities of pyrites would you prefer to use, assuming these had to serve for the production of (*a*) sulphuric acid, (*b*) copper precipitate, and (*c*) purple ore?

2. Which process would you recommend for the manufacture of nitric acid—the vacuum process, or the pressure distillation one? Give the reasons for your answer.

3. State what you know about the condensing apparatus of a hydrochloric acid plant. What volume of packing would you afford per ton of salt decomposed, and what type of packing would you adopt?

4. What steps should be taken to ensure efficient extraction of copper from pyrites cinders?

5. If saltcake and hydrochloric acid are to be produced from nitre cake and salt, in what form should the nitre cake be? What type of plant would you recommend for the working of the latter mixture?

6. The escape of a sulphuric acid plant is showing eight grains of SO_3 per cubic foot. What conditions would you expect to obtain on the plant, and what steps would you take to restore the plant to normal working?

7. A sample of chemical sheet lead which has been used in connection with a sulphate of ammonia saturator has become seriously honeycombed. To what cause would you attribute this, and how would you determine if the defect was due to the chemical sheet lead?

8. If only a 60 per cent. reduction is being secured in the reducing furnace of a sodium sulphide plant, what steps would you take to secure better results?

9. How would you make muriate of ammonia, (*a*) if you were in charge of an ammonia-soda plant, (*b*) if gasworks ammoniacal liquor was available? Answer and give a sketch of the plant for either (*a*) or (*b*), but not for both.

10. It is desired to manufacture bleaching powder at a point where salt is found. What process would you recommend in such circumstances? State the probable efficiency of the plant you recommend.

Engineering Laboratory Developments

A number of guests were present at an "at home" at University College, London, on Wednesday, and were received by Sir John Bradford, in the absence of Lord Chelmsford, the chairman of the College Committee. The object of the visit was to enable engineers and headmasters of public schools to inspect the new buildings of the Faculty of Engineering, which have just been completed, and which will be formally opened at a date to be arranged in the near future. The main engineering laboratory is equipped to show the best practice in heat engines, and provision is made for experiment and advanced research; also for experiment in connection with the testing of materials. For advanced and post-graduate students, in addition to a laboratory, there are available a number of small rooms suitable for research work.

The reconstruction and re-equipment of the engineering buildings has so far cost the authorities of the college £53,500, of which £10,000 has been contributed by the London County Council, £10,000 by Lord Cowdray, and large sums by various commercial firms and oil companies.

Modern work in industrial chemistry is so intimately connected with engineering that if is proposed to erect, with the aid of a grant of £25,000 from the Ramsay Memorial Fund, a chemical engineering building to house the equipment and lecture-rooms and give other special accommodation required for this purpose. The department has already made a promising start, and is intended to form a connecting link between the School of Chemistry under the direction of Professor Collie, F.R.S., and Professor Donnan, F.R.S., and the Engineering School.

Institute of Metals

Dr. F. W. Aston on Atoms and Isotopes

THE Annual May Lecture of the Institute of Metals was delivered on Wednesday by Dr. F. W. Aston, F.R.S., at the Institute of Mechanical Engineers, London, the subject being, "Atoms and Isotopes."

That matter is discontinuous and consists of discrete particles is now an accepted fact, said Dr. Aston, though it is not obvious to the senses on account of the extreme smallness of the particles. Some idea of their size and numbers can be gained by the hypothetical division of a piece of matter into smaller and smaller pieces until the ultimate atom is reached. For this purpose a model decimetre cube of lead is taken and cut in such a manner that after each operation a similar cube of half the linear dimensions and one-eighth the volume results. Modern science shows that this operation can be repeated no less than 28 times before the ultimate atom of lead is reached, and that the number of atoms in the original cube is so enormous that placed in a string as close together as they are in the lead they would extend over six million million miles. Again, if an ordinary evacuated electric light bulb were pierced with an aperture such that one million molecules of the air entered per second, the pressure in the bulb would not rise to that of the air outside for a hundred million years.

Dalton and Prout

Dalton in his atomic theory postulated that "Atoms of the same element are similar to one another and equal in weight," a simple and definite conception which has been of inestimable value in the development of chemistry. A little later Prout suggested that the atoms of all elements were made of atoms of a primordial substance which he endeavoured to identify with hydrogen. If Dalton and Prout were both right the chemical atomic weights should all be whole numbers, hydrogen being unity. Chemical evidence was against this, and Prout's theory was abandoned for the time. We cannot test the truth of Dalton's postulate by chemical methods since these require countless myriads of atoms, and, therefore, only give a mean result.

The weights of individual atoms can be investigated by means of the analysis of positive rays, and the early experiments of Sir J. J. Thomson suggested that one element—neon—had atoms of two different weights but the method of analysis was not accurate enough to prove the point. The requisite accuracy has been obtained by means of an instrument called the "mass-spectrograph." In this the charged atoms in a beam of positive rays are sorted out according to their weight by means of magnetic and electric fields so that they strike a photographic plate at different points. A mixture of atoms of different weights will give a series of focussed lines called a mass spectrum, and the relative weights of the atoms can be calculated from the position of their lines to an accuracy of 1 in 1,000.

As the result of this analysis it has been shown that neon (atomic weight 20·20) is a mixture of atoms of weights 20 and 22; these constituents have identical chemical properties and are called "isotopes." Chlorine (A.W. 35·46) is a mixture of isotopic atoms of weights 35 and 37. About half the elements so far analysed turn out to be mixtures and some are very complex. Thus krypton has six, tin at least seven, and xenon possibly nine constituent isotopes. Recently by means of the method of "accelerated anode rays" the work has been extended to many metals, and already some fifty of the eighty-four known non-radioactive elements have been analysed into their constituent isotopes or shown to be "simple."

The Whole Number Rule

Most important of all is the fact arising out of these measurements that all true weights of atoms can be expressed as whole numbers to a very high degree of accuracy. This remarkable generalisation known as the "whole number rule" has removed the last obstacle in the way of a simple unitary theory of matter. We now know that Nature uses the same bricks in the construction of the atoms of all elements, and that these standard bricks are the primordial atoms of positive and negative electricity, protons and electrons.

According to the nucleus theory of the atom first suggested by Sir Ernest Rutherford, which has led to such wonderful advances recently in the hands of Professor Bohr, all the protons which are much heavier than electrons, are packed with some of the electrons in a central nucleus or sun round which circulate the remaining electrons like planets in orbits. The protons and electrons are so minute compared with the atom itself that it is difficult to indicate their numerical relations. If we were to construct a scale model of the atom as big as the dome of St. Paul's we should have some difficulty in seeing the electrons, which would be little larger than pin heads while the protons would escape notice altogether as dust particles invisible to the unaided eye. Experimental evidence leaves us no escape from the astounding conclusions that the atom of matter as a structure is empty, empty as the solar system, and that what we measure as its spherical boundary really only represents the limiting orbits of its outermost electrons.

All the chemical and spectroscopic properties of an atom depend on the movements of its planetary electrons, and these in their turn depend on the positive electric charge on the central nucleus. In the case of isotopic atoms the net positive charge on their nuclei is the same, giving identical chemical properties, but the total number of protons is different, giving different atomic weights.

Disruption of the Nucleus

Transmutation of one element to another can only be achieved by the disruption of the nucleus. This requires enormous forces, but by the bombardment of atoms by swift alpha particles Rutherford has succeeded in breaking up the nuclei of several of the lighter elements. This transmutation only takes place as the result of a direct hit on the nucleus the chance of which is only one in many millions. The quantity of matter so transmuted is indeed almost inconceivably small, but it is the first step towards the release and control of the so-called "atomic energy." We know now with certainty that four neutral hydrogen atoms weigh appreciably more than one neutral helium atom, though they contain the same units, 4 protons and 4 electrons. If we could transmute hydrogen into helium matter would, therefore, be destroyed and a prodigious quantity of energy would be liberated. The transmutation of the hydrogen contained in one pint of water into helium would set free sufficient energy to propel the *Mauretania* across the Atlantic and back at full speed. With such vast stores of energy at our disposal there would be literally no limit to the material achievements of the human race.

Swedish Industries Fair at Gothenburg

GOTHENBURG, whose Jubilee Exhibition was held last year, will this year again be the scene of a Swedish Industries Fair, at which all branches of Swedish industry will be fully represented. An opportunity will be afforded of a thorough survey not only of such staple products as iron and steel, paper and pulp and timber, but of innumerable other products in which Sweden specialises. The Gothenburg Fair is the only official national fair, and has the support of all the great commercial and industrial organisations of the country, each of which has established its information bureau. Interpreters will be available gratis, and careful arrangements have been made for providing suitable accommodation at reasonable prices for visitors. In addition to staple products the main groups of exhibits include machinery and tools, metal products, sporting articles, heating, lighting and sanitary appliances, electrical apparatus and machinery, glass and porcelain, textiles, arts and crafts, scientific instruments, chemicals, foodstuffs, etc. The Fair will be open from August 4–10.

British Gas Industries Dinner

THE dinner of the Society of British Gas Industries was held on Thursday, May 29, at the Holborn Restaurant, London. Lord Weir presided, and in responding to the toast of the evening (proposed by Major R. Strother Stewart, M.P.), said there were indications that the future of the industry would be complementary to that of electricity. Gas had much to teach electricity, and great good should result from such a marriage. When engineers were discouraged they had a real compensation in their ability temporarily to forget the commercial aspect and to pay attention to the scientific and technical side of their work. That was the field of effort on which the country must ultimately rely for any measure of prosperity.

Oil and Colour Chemists

Annual Meeting and Dinner

THE annual meeting and dinner of the Oil and Colour Chemists' Association was held at the Holborn Restaurant, London, on Thursday, May 29. Dr. J. Newton Friend (the retiring President) was in the chair.

In the annual report of the Council for 1923–24 reference was made to the re-apportioning of the work of administration, due to the growth of the work of the Association. The Council has appointed Mr. J. H. Aiken to the position of General Secretary, a part-time paid appointment, though the honorary officials retain their offices. Mr. Aiken is a member of the staff of the Institute of Chemistry, and the Association has expressed thanks to the Council of the Institute for having permitted Mr. Aiken to undertake his duties in connection with the Association.

The Journal of the Association, eight issues of which have been published during the year 1923-24, is now to be published monthly.

The report referred to the efforts which have been made to form an Institute of Paint and Varnish Technologists. The Provisional Council of the proposed Institute had reached the point of adopting Bye-laws and Articles of Association, of which the Council of the Oil and Colour Chemists' Association had approved, subject to the approval of its members, but ultimately it was decided to abandon the project in view of lack of support.

Reference was then made to the incorporation of the Paint and Varnish Society with the Association. Members of the Society could join the Association as associate members, or, where scientific qualifications permitted, as ordinary members. The necessary alterations to the rules were approved in March, negotiations have now been completed, and former members of the Society have been invited to transfer their membership to the Association. The Council of the Association is of opinion that the unification in one body of the scientific and technical interests of the industry offers wide possibilities for future development.

Paint and Varnish Standards

The report then dealt with the external activities of the Association, and mentioned a number of new or revised specifications drawn up by committees on which the Association was represented, which have been published since the last annual report. With regard to the standardising of certain tests for pigments, paints, varnishes, etc., it was stated that, whilst definite progress has been made during the last few years in this connection, such tests and standards have, in the main, been adopted by very few of the large users of these materials, notably the Air Ministry and the War Office. Therefore, it is a matter of considerable gratification that a very comprehensive and fully representative Committee was set up in February last, under the auspices of the British Engineering Standards Associations, to study the question of paints and varnishes used in engineering and allied trades, with a view to preparing a schedule of British Standards. Dr. J. Newton Friend (the retiring president of the Association) is chairman. The Association has two official representatives on the Committee—Messrs. C. A. Klein and J. N. Tervet—whilst, in addition, other members of the Association are acting on the Committee as representatives of other public bodies.

Formation of Local Sections

A scheme for the creation of local sections of the Association has been approved, and steps are being taken for the establishment of such sections in Birmingham, Manchester and Hull.

In the new constitution of the Association, associate members have been given representation on the Council, while, at the same time, it has been made impossible for the scientific element to be obscured. The Council has no doubt that, with mutual co-operation between scientific and technical interests, the increased value of the Association to the industries as a whole is assured.

A statement of the Association's accounts was available for members to inspect if they desired. It showed that up to April 30 there was an excess of assets over liabilities of £125 os. 8d. The report was adopted unanimously.

Election of Officers

The following are the officers for the year 1924–25:—President, Dr. H. H. Morgan; Vice-Presidents, Dr. J. Newton Friend, Mr. C. A. Klein, Mr. M. Harrison, and Mr. S. K. Thornley; Hon. Secretary, Mr. H. A. Carwood; Hon. Treasurer, Mr. S. G. Clifford; Hon. Editor, Mr. T. Hedley Barry.

A vote of thanks was passed to Dr. Newton Friend, the retiring president, and he was presented with a bound volume of the Proceedings covering the two years of his presidency.

Annual Dinner

The meeting was followed by the annual dinner, at which there were present a large number of members and guests.

The toast of "The King" having been duly honoured, Dr. A. Scott, F.R.S. (representing the London Section of the Society of Chemical Industry) proposed "The Oil and Colour Chemists' Association." In a reference to the aims and objects of the Association, he said he rejoiced to see the activities of bodies such as this, which afforded opportunities for the discussion of specialised subjects which could not very well be afforded by the older or parent societies.

Dr. J. Newton Friend, in response, expressed pleasure at seeing so many members and guests present. He reviewed briefly the activities of the Association during his presidency, when they had had a series of changes both in their administration and in their outlook. With regard to the creation of the class of associate members of the Association, he said there were already some thirty associate members. The difference between the ordinary members and the associate members was that the former were more academic than the latter, but the latter were people who had a very great interest in the trade, and it seemed a pity that purely academic considerations should exclude them.

Referring to the new President, the Association, he said, could not have chosen a more suitable gentleman for the office. While they recognised the splendid work he had done in the past, they were sufficiently greedy to ask him to do even more by accepting the office of President. They assured him of their loyalty as an Association, and wished him great success during his period of office.

Mr. C. A. Klein proposed the toast of "Our Guests," and extended a hearty welcome to the guests present, who included chemists as well as those who used the products of the oil and colour chemists.

Mr. R. B. Pilcher, responding, referred to the cordial relations existing between the Association and the Institute of Chemistry. The Institute, he said, was at all times devoted to the interests of chemists, in whatever branch of work they might be engaged. He might say that every chemist was a friend, though every friend was not a chemist. They heard much of co-operation and amalgamation among chemical societies, but he felt that the advances due to specialisation and concentrated effort had been so great that, whatever form the co-operation of the various chemical bodies might eventually take, the activities of specialised groups would remain unhampered, and that not the least important of these groups would be represented by the Association.

Mr. T. S. Rowden, who also responded, said that the London Association of Master Decorators were doing their best to apply the products of the oil and colour chemist in the best possible way. He referred in particular to a strong organisation, working in conjunction with the operatives, for training young fellows between the ages of 14 and 21 for the painting trade.

Mr. W. J. Palmer then proposed the toast of "The National Federation of Associated Paint, Colour and Varnish Manufacturers." The aim of the Federation was to establish stable conditions in the industry, and to effect progress, which really meant the welfare of chemists and those associated with them in the industry. The Federation was one of the parents of the Oil and Colour Chemists' Association; the other parent, probably, was "fatty acids." (Laughter.) The child had become healthy and vigorous, and the parent was growing more vigorous.

Mr. S. J. Hann (Chairman of the London Section of the Federation) responding, expressed the Federation's gratitude to the Association for the work they had done, when the Association was first formed, in connection with fatty acids. Since then, the Association had grown out of all knowledge, and he congratulated them on the happy position they now occupied. The Federation and the Association seemed to him to be complements of each other; the one could not very well exist without the other.

Reviews

LIME AND MAGNESIA. By N. V. S. KNIBBS, B.Sc. London: Ernest Benn, Ltd. 1924. Pp. 306. 30s. net.

The burning of limestone is one of the oldest chemical operations, and the growth of the industry has been for the most part by rule of thumb methods with few established principles to serve as guide. There is a mass of collective practical experience, and a voluminous and scattered literature has accumulated; but, hitherto, there has been no treatise dealing in an authoritative manner with the whole subject. Mr. Knibbs has filled this very definite gap and has performed a notable service to the lime and magnesia industries by writing an exceedingly clear and systematic account of the chemistry, manufacture and uses of the oxides, hydroxides, and carbonates of calcium and magnesium. The book, moreover, will certainly prove of value to many chemists and technologists outside these two industries.

The subject matter is dealt with under three main headings —chemistry, manufacture, and uses—and each section is subdivided in a manner that greatly facilitates reference to any particular point.

The chemistry of lime and magnesia is treated in considerable detail and a mass of interesting information is brought together and discussed in an illuminating manner. Perhaps the most useful thing to do in a short notice is to call attention to a few of the points considered, in order to give an idea of the scope of the book. Under the heading of the general chemistry of lime we get accounts of the preparation and properties of calcium oxide, hydroxide and carbonate; the reactions of calcium hydroxide in the dry condition and in aqueous solution and suspension; the indentification, formation and stability of calcite, aragonite and other forms of calcium carbonate. References are given for all physical and chemical data quoted. Magnesium compounds, dolomite and magnesium limestone are also dealt with fully.

A chapter is devoted to the analysis and testing of lime and magnesia products; and another, of particular interest, to the chemistry and physics of the dissociation of the carbonates. This includes a discussion of the over-burning or dead-burning of limestone, a condition due to over-heating or to exposure for too long a period at the burning temperature, resulting in a lime which when moistened slakes only very slowly. The approximate maximum temperatures which should not be exceeded, if dead-burning is to be avoided, are known for several types of lime from the work of Bleininger and Emley; but, as the author observes, the figures are not very helpful to lime burners without more information on the relation between impurities and maximum temperature and on the effect of the time factor.

The majority of the substances considered are among the commonest of materials in use in chemical industry; and yet perhaps the most marked general impression left on the mind of the reader of this part of the book is the need for further investigation on a great number of points, many of them of considerable importance. Time after time, the author is obliged to finish his discussion of particular subjects by a reference to the lack of exact information. For examples:—on page 51, "No satisfactory explanation of these facts (variation of available lime content and other properties of calcium hydroxide according to the method of preparation) has yet been given and further investigation is required"; on page 76, "The properties of magnesium hydroxide have not been much studied"; on page 109, "The effect of overheating during hydration (of lime) has never been fully investigated and the nature of the change is still obscure"; on page 104, "The only conclusion that can be arrived at is that if steam is effective in assisting the calcination of limestone it is difficult to explain its action." Quotations of this kind could easily be multiplied.

The second section of the book deals shortly with the winning and preparation of raw materials; and, at considerable length, with the process of lime burning, the construction of various types of kilns and their operation, control and thermal efficiency. There are also chapters on the hydration of lime, the general lay-out of a lime plant and the manufacture of caustic and dead-burnt magnesia.

The final part, on the uses of lime and magnesia, is perhaps less satisfactory, since it is of necessity highly compressed. Separate volumes might easily be devoted to the use of lime in agriculture, in building construction and in chemical industries; but comparatively brief as the author's survey is, it is easy to believe that "no other inorganic compound has played so important a part in human affairs for so long a period."

The very special importance of the physical condition of lime and lime products is emphasised. The building industry generally considers *only* the physical properties, since the properties of settling, plasticity and strength of the resulting mortar or plaster are the matters of primary importance. The chemical composition is of little interest because "limes of practically identical composition often behave quite differently when employed for the same purpose." This is, of course, not the case with regard to the uses of lime in chemical industry, and in general it may be said that an impure limestone burnt in contact with solid fuel is normally most suitable for making lime for building purposes, whilst a pure limestone heated out of contact with fuel is to be preferred for chemical manufactures.

Space will not allow of more than the barest mention of the chapters specially concerned with the magnesia industry and the use of magnesia products as refractories, for making magnesium oxychloride cement, as thermal insulators and in pharmacy.

Finally, praise is certainly due to the publishers and printers who are to be congratulated on the admirable manner in which the book has been produced.

C. T. G.

STANDARD METHODS FOR TESTING PETROLEUM AND ITS PRODUCTS. The Institution of Petroleum Technologists, 1924. 6s.

In this important publication there appears for the first time in this country an authoritative statement as to the tests to be applied to petroleum and its products, and the mode of applying them has been formulated in detail. It is not to be considered as a surrender of independence that so many of the British standard tests should coincide with the American; long experience, previous standardisation (even if "tentative"), and a desire to proceed in a manner that encourages the likelihood of an ultimate international agreement, are responsibile for such adoptions, after due consideration.

It is intended that the matter put forward shall be considered also as being tentative, to the extent that this first issue is to be taken not so much as law but as a guide on trial. There seems, however, little doubt that future review will alter very little, apart from subsequent scientific progress.

The scope of the tests ranges from crude oil and gasoline—and it is to be hoped that when nomenclature is examined for standardisation that this latter term will not be retained—to asphalt; and the presentation of the whole is admirably clear and logical. The work of the various sub-committees has obviously been an arduous one, and the petroleum industry —and not the British industry alone—is under a debt of gratitude to them.

SPECTROSCOPY (Vol. I.). By Professor E. C. C. BALY, F.R.S. London: Longmans, Green and Co. Third edition. Pp. 298. 14s. net.

Professor Baly's book on "Spectroscopy," issued in the series of text books of physical chemistry under the editorship of Sir William Ramsay and Professor Donnan, has been recognised for some years as a standard work on the subject, and the appearance of a new edition bringing the matter up to date is welcome. So much work has been done on the subject since the second edition in 1912 that the present edition has had to be divided into two volumes, of which the first only has so far appeared. This covers standard methods of work in the visible and ultra-violet and infra-red regions of the spectrum, and thus corresponds to the first part of the earlier editions.

Australian Sulphuric Acid

SULPHURIC acid production in Australia increased considerably during 1923 with the investment of many thousands of pounds sterling in plants to produce acid from zinc concentrates and pyrites. This is stated to have been largely brought about by the duty on sulphur.

The British Empire Exhibition

Notes and News of Chemical Interest

DURING a recent visit to Wembley the occurrence of one of the heavy thunderstorms which have been such a feature of the weather of late gave us an opportunity of seeing the effect in the Chemical Section of the various devices of artificial lighting. Among these the "colour fountains" of the B.D.C. and the illuminated Erasmic soap fountain are prominent, but the majority of the exhibits have some little device or other which makes an attractive show, as for example, the illuminated sign representing a still, in front of W. J. Fraser's stand, where red fumes appear to be continually rising upward.

A number of changes continue to be made in the Chemical Section, usually of a minor nature—a new sign, or the rearrangement of exhibits—but occasionally a striking new exhibit is introduced, such as the model dyestuffs factory just added by the British Dyestuffs Corporation. Among the small changes noted, however, was the removal of the "fiery fountain" in the Scientific Section, and the addition of a pleasing fern rockery by the Buxton Lime Firms Co., with rocks composed of the finest limestone.

The B.D.C. Factory

As part of the scheme to interest layman and chemist alike in the growth and value of the British dye industry, the British Dyestuffs Corporation have added a new feature to their exhibit in the form of a scale model dyestuffs manufacturing shed. This represents an actual shed whose dimensions are 263 ft. long, 90 ft. wide and 35 ft. high. In the model the floors (it is a three-storey building) and the sides are made of glass, so that the plant inside can be clearly seen. The vats, filters, boilers, etc., in the plant are also to scale and are carried out in wood, being simplified by the omission of all details. The shed is arranged as it would be to produce four typical dyestuffs from the raw materials, and to enable visitors to follow the processes, very clear flow-sheets appear below the model so that the purpose of each item can be understood. The dyestuffs chosen are chorazol black E, naphthol green B, methylene blue, and cholrozal blue B. The first three are shown on one side of the shed, while the last-named occupies the whole of the other side. In the case of chlorazol blue the raw materials start at each end, leading to the manufacture of the two intermediates, benzidine on the left and H acid on the right. The production of the dyestuff from these products is shown in the centre. The manufacture of this dyestuff is also amplified by an exhibit of bottled specimens of each of the intermediate stages from coal tar, and sample dyeings of the finished dyestuff. In the case of naphthol green B, the first stage of the plant shows the production of β.naphthol from naphthalene, the second its conversion to Schaeffer salt, and the last the preparation of the dyestuff from Schaeffer salt by the action of nitrite and ferric chloride. Chlorazol black is a trisazo dye, and the plant is typical of an azo unit. The intermediates used are benzidine, H acid (the production of which can be seen from the chlorazol blue flow-sheets), aniline and *m*-phenylenediamine. The production of methylene blue from its intermediates is also illustrated in a similar manner, this dyestuff having been chosen because of its uses in addition to the dyeing of silk and wool as a microscopic stain and a therapeutic agent.

A Combined Stand

The exhibit of the Colne Vale Dye and Chemical Co. and J. C. Oxley's Dyes and Chemicals, Ltd., is virtually one stand, divided into two halves which are treated similarly. Something like a hundred bottled samples of dyes are shown by each firm, making an exhibit which will demonstrate clearly to the average visitor that the British dyestuffs industry is not in the hands of one or two firms with a few others making dyes occasionally. Both the Huddersfield and Dewsbury firms on this stand are individually producers of a comprehensive list of dyes that would be a credit to any manufacturer. The similarity between the exhibits is further emphasised by the samples of dyed fabrics and placed beside the dyes themselves, showing once more to the layman the fact that the colours of the two are frequently very different.

Valuable Malaya Products

Almost every colonial exhibit can show something of chemical interest, but British Malaya has a greater space devoted to the display of oils, rubber and minerals than any of the other Dominion exhibits. The interest with regard to rubber is mainly in specimens of the rubber tree and samples of raw and partly cured rubber. Oils are given a great deal of space, and samples of various fixed oils and the seeds from which they are obtained form one of the main features of the pavilion. The fixed oils include chaulmoogra oil, cashew nut oil, castor oil, cotton seed oil, and ground nut oil, and in addition there are the essential oils of cloves, limes and patchouli. Malay, like Cornwall, has valuable deposits of china clay, tin, and rare minerals, and these are well displayed in the exhibit. A special feature is made of the uses of tin, over 36,000 tons of which is exported annually to South Wales for the manufacture of tinplate. Among the uses of tin, its salts are not forgotten, and there are some samples of fabrics dyed with alizarine dyes (made by the British Alizarine Co.), using tin salts as mordants. In addition the uses of the rare elements are well demonstrated, there being examples of incandescent gas mantles, electric light bulbs, scientific instruments, alloy steels and so on, where use is made either of thorium, zirconium, cerium, didymium, or molybdenum, all Malayan products. Various salts of these elements may be seen, and also samples of monazite sand from which many of them are extracted.

British Sulphate of Ammonia Federation

No one who visits the Palace of Industry at Wembley can fail to notice the display which has been erected by the British Sulphate of Ammonia Federation, Ltd. It occupies a very prominent position in the main avenue of the Palace of Industry near the Conference Hall, and next to the Gas Exhibit, and has already attracted a great deal of attention. In decorating its back wall, the Federation has struck a bold note in an attractive if unconventional colour scheme. Three large oil paintings, admirably executed by the well-known artist, Mr. Malcolm Milne, depict, in half decorative, half naturalistic style, the essential features of a modern works, and the admirable results obtained by the use of sulphate of ammonia on citrus and other tropical fruits and crops.

The remainder of the exhibit consists of various displays illustrating the methods of using sulphate of ammonia and the profitable results obtained by farmers. The fact that sulphate of ammonia comes from coal has been graphically illustrated, as well as the great difference between the "ordinary" quality and the "dry neutral" sulphate. A wide range of samples of this fertiliser are displayed to show the varying colours and size of crystal in sulphate made by the various processes. A large sack of sulphate of ammonia forms the centre-piece at the back of the stand, and a large circular basket contains a heap of neutral sulphate. Literature on the use of sulphate of ammonia on all the ordinary farm and garden crops, as well as a special publication on its use in agriculture in Europe and the tropics, can be had on request. Visitors to the Exhibition are invited to drop a note of their requirements into a box in the literature table and the leaflets will be sent gratis and post free.

Novel Dye Testing Method

THE U.S.A. Bureau of Standards finds that in some cases the ordinary method of determining the two factors of strength and quality by comparing dyeings made from a standard of known value with dyeings made from the dye being tested can be omitted and an estimate of the strength of the dye secured by measuring with a spectrophotometer the light transmitted through the solution. This method was tried with the dye chromotrope 10B and the results given were found to agree well with those obtained with the practical dyeing test. The method does not show the small variations in hue and brightness that are given by the dyeing test, but does show the larger variations of quality.

The Exclusion of Germany from International Research

To the Editor of THE CHEMICAL AGE.

SIR,—We are asked to make public the following resolution, which was agreed to unanimously at the last meeting of our Executive (National Union of Scientific Workers) :—" That the organisation of scientific unions or congresses, which are described as international but from which particular nations are excluded on political grounds, is unworthy of the spirit and injurious to the interests of science."

The unions referred to in the resolution are those organised by the International Research Council. As a large proportion of the scientific community are very ill-informed concerning this council, and many indeed appear to be unaware of its existence, it may be useful if we quote some particulars about it from the *Year Book* of the Royal Society.

The International Research Council was formed in 1919 for the purpose of facilitating international co-operation in scientific work, and promoting the formation of international unions in different branches of science. It is " managed by an executive committee, the general secretary of which is Sir Arthur Schuster, For. Sec. R.S." Under its auspices unions have been formed in " astonomy, geodesy and geophysics, chemistry, mathematics, radio-telegraphy, physics, geography, and biological sciences," and " provisional statutes " have been drawn up for a Union in Medical Sciences.

It is possible that the objects of the council might have been described in simpler terms. Effectively, the council exists not to promote " international co-operation " but to exclude the Germans from it. Its statutes, at any rate, contain very elaborate provisions which can have been designed only to secure this end. Their effect may be summarised as follows. Until 1931 ex-enemy nations are excluded without reservation. After 1931 the question of their admission may be considered ; but it must not be imagined that any particular union will be at liberty, even then, to change its policy if it desires to. Such a change can only be effected by a change in the statutes of the council itself, and " no change shall be made in the terms of the convention except with the approval of two-thirds of the adhering countries." Einstein, then, is excluded from " international co-operation " in astonomy until 1931. His admission then will depend not upon the wishes of astronomers (unless they denounce the council) but on their power to secure a two-thirds majority on the executive committee of the council.

The resolution which we communicate to you embodies what we believe to be the considered opinion on this matter of the vast majority of English men of science ; and it may be asked how, if this be so, the present situation has arisen. The explanation, we think, is this, that the matter is one in which very few people in England have taken an active interest ; that there has been a great deal of pressure from two particular foreign countries ; that a small minority has seized the opportunity and brought these organisations into being ; and that, once in existence, they have persisted by force of inertia, the majority having acquiesced reluctantly, but having lacked the courage or the energy to protest. We are glad to say that there are signs of growing opposition to the policy of the council. Particular scientific societies have declined to recognise its authority ; invitations to " international " congresses have been withdrawn ; and congresses of a genuinely international character, such as the Physiological Congress at Edinburgh and the Psychological Congress at Oxford, have been organised successfully. As regards the biological sciences the situation is obscure. It is certain that, until quite recently, biologists in England had declined to recognise the council, and had expressed their opposition to its policy in unambiguous terms ; but it would seem, from the passage in the Royal Society's *Year Book* which we have quoted, that an " international " Union of Biological Sciences has now been formed. It is plain, however, that this body (whatever it activities may be) can have played no part in the organisation of the Edinburgh Congress.

Our executive were unanimous in the opinion that the time has come when some more organised and energetic protest should be made against these attempts to perpetuate international passion in the name of science ; and we were asked to communicate our resolution to the principal academies and scientific societies of Europe and America, and to the press.

We shall be glad to hear from any scientific worker, whether connected with our Union or not, who may have suggestions for further action.—Yours, etc.,

G. H. HARDY, President.
A. G. CHURCH, Secretary.

25, Victoria Street,
Westminster, S.W.1.
May 30, 1924.

Science and Labour Conference

Contributions by Scientists and Politicians

SCIENCE and Labour was discussed at a conference organised by the British Science Guild and the National Joint Council of the Trades Union Congress and Labour Party at Wembley on Friday and Saturday last week. It was to have been opened by the Prime Minister, but Sir Richard Gregory, the chairman at the morning session, stated that owing to public business he was unable to be present. He read a letter from Mr. MacDonald, in which he stated that he was sorry that a Cabinet meeting prevented his attending the conference.

Sir Richard Gregory, referring to the subject for the morning session, " The Place of Science in Government," said wealth was created eventually by scientific discovery. In the political field usually the chief consideration was given not to means of creating wealth but to the distribution of wealth between those who used the knowledge obtained by science. One would hope that as a result of a conference of that kind Labour would understand the scientific point of view, and that what scientific men were doing was really of great ultimate advantage industrially and socially to the world.

Mr. Sidney Webb, President of the Board of Trade, said it was suggested that the Legislature could not be fully effective without the presence of men or women of high scientific training and experience. If that provision ought to be made for scientific membership of the House of Commons, he feared that, having regard to the characteristics of modern constituencies, there was a certain futility about the proposition. He had known a few distinguished men of science who had by happy chance become members of Parliament, and he did not think they were distinguished for their success in Parliament.

Sir Richard Glazebrook said the conference would have done its work well if it could impress on the Government the need for research in pure science guided by men free to follow the lines along which their investigations led them.

Major A. G. Church, M.P., expressed the opinion that if there were a few more scientific men in the House of Commons the country would be able to pay more attention to vital questions.

Research in Relation to Industry

" Scientific Research in Relation to Industry " was discussed at the afternoon session, when Lord Askwith presided. Mr. Hugo Hirst, in opening the discussion, argued that by the application of science the burden of labour was lightened, labour was lifted to a higher level, the cost of production was reduced, and commodities were brought within the reach of many who could not otherwise afford to buy them.

Sir Oliver Lodge spoke on the importance of pure science to industry, and, referring to applications that might be made of remarkable new researches into atomic constitution, said it was an undoubted fact that there were immense stores of energy locked up in the atoms of matter and in the ether of space ; and it seemed to him quite unlikely that 50 years would elapse before some of this energy was tapped and applied to practical purposes. The amount of this energy was so vast that if we could get at only 1 per cent. of it we should have a source of power which would put all others into the shade.

Sir Daniel Hall, scientific adviser to the Ministry of Agriculture, pointed to the results of the application of science to the agricultural industry, and, referring to the work of Professor Biffen in regard to wheat, said statistical records were beginning to show its effect on the average wheat yield.

On Saturday Miss Margaret Bondfield, M.P., Under-Secretary for Labour, pleaded for the better recognition of the human factor in industry.

Dr. Charles S. Myers, speaking on industrial psychology, said there were very few industries where output could not be increased by some period of rest during a continuous spell of work.

Wages and Profits

The Forces that Govern Them—Why Neither Benefits at the Expense of the Other—Four Essentials to Success in Business

By Sir Ernest Benn

THE question of the remuneration of labour and the question of making the profits are both so important, and a right understanding of them is so essential to the national prosperity that we really must as a people undergo a course of thoughtful study and endeavour to get our fundamentals right, so that our views, when we have to express them, may at least bear some relation to the forces that govern both wages and profits.

One of the earliest strike speeches that I remember hearing was in Birmingham, where a trade union leader was explaining to men on strike that one of the employing companies had actually accumulated a reserve fund of half a million of money. That statement was naturally sufficient to make the wage-earners who heard it feel the justice of their demand for an increase in wages. So far as I recollect, the case of the strikers on that occasion was a good one. There was need for the wages to be improved, but it is fairly safe to say that the real considerations underlying the problem were absent from the minds of most of those concerned and that they were thinking along the lines of the trade union orator, with his talk of the half million of money, what could be done with it or how they could get hold of it.

The Wrong View

Most of us, when thinking of wages or profits, visualise some extremely simple case—generally a case that does not exist—and allow ourselves to be carried away in one direction or another by our view of the equity of this set of supposititious circumstances. We picture something like this. One man owns a seam of coal for which he has paid nothing, and if he can sell the coal for £1 a ton he gets somebody to dig it for him at 10s. a ton, putting the other 10s. into his own pocket. No such case exists, but it is good enough for the purpose of argument. It is quite obvious that if the owner of coal can be forced to raise the wages from 10s. to 15s., wages are increased at the expense of profits, or, conversely, if the owner of the coal can force down wages from 10s. to 5s. he adds 5s. to the amount of his profit. On some such simple reasoning as this the public, in its careless way, accepts the theory that if profits are good they are made at the expense of labour, or that the existence of good profits should be a good reason for increasing the remuneration of labour, and it reaches the utterly wrong conclusion that profits go up at the expense of wages, or wages go up at the expense of profits.

To start at the beginning we must, I think, somehow be made to see that wages and profits are two entirely different things, and in fact bear very little relation one to the other. Wages are given in return for work and effort, whereas profits arise from a number of causes, but chiefly as a payment for the risk involved in the production process. Wages are admittedly a first charge upon an undertaking; profits are the last. Wages come out of production, profits come out of exchange. In normal times and in a normally prosperous business, profits and wages will go up and down together, thus showing the absurdity of the idea that there is any conflict of interest between them, or that one benefits at the expense of the other. An increase of wages means an increase of cost at every stage of the process of production and marketing when selling possibilities are unknown and, therefore, an increase in the risk of the transaction, from which it follows that a bigger profit is necessary. The bigger the risk the bigger the profit must be to induce someone to take the risk, and in a free market, that all-important desideratum for which we are all looking, the profit will always be the lowest figure which will induce someone of all the competing owners of capital to come forward and take that risk.

The Ideal State of Affairs

The ideal state of affairs—an ideal which is within our grasp—when an industry will be functioning properly and conferring increasing benefits upon everybody depends upon four essentials, which are always found in combination where real success is achieved: (1) high wages, (2) high profits, (3) high production, (4) low prices. It seems at first sight to be paradoxical that the halving of the price of an article may double the wages and double the profits, and yet everybody knows that that is done, and so it may seem also to be paradoxical that high profits should sometimes appear side by side with low wages and high wages with low profits.

Let us turn back for a moment to the popular case of the owner of a seam of coal, with his £1 a ton selling price, 10s. a ton wages and 10s. profit. If we may assume that there is only one owner, only one seam and only one workman, and that the price of £1 is a fixture, it would be true that wages could be made at the expense of profits or profits at the expense of wages. The fact is that our assumed owner can make 10s. a ton on his seam of coal everybody else who thinks there may be coal upon his property will busy himself digging for it, paying wages without any profit, and that many other seams of coal will be discovered, all of which will produce wages, but all of which will not produce 10s. a ton profit. The process will continue until somebody finds that his seam cannot be worked at a profit at all, and at that stage the market for labour in coal mining may be said to be saturated. If this is the real situation, it is obvious that any tampering with the 10s. profit of the fortunate owner of the good seam must discourage all other owners and prospective owners, and if the first worker does raise wages so as to get 5s. of the first profit he must throw out of work many of those who are working less remunerative seams. If wages had a claim on profits, profits would cease to function as the index which will guide initiative into the right channels.

No Antagonism Between Wages and Profits

If an industry is known to be profitable the people turn their attention to it, put their sons into it and invest their capital in it, and one of the effects of all this is that there is increased competition for labour in that industry and wages go up. Big profits, therefore, do make more wages. It is essential from the wages point of view that there should not only be profits, but that there should be good profits. So far as there being any antagonism between wages and profits, one depends upon the other.

The Ford car gives us a standing illustration—an illustration which has been almost worn bare, but which remains true, and will be found to be true right through in every case. Henry Ford has produced a product at a price that was never thought possible. He has been a powerful lever for the raising of wages, and in the course of a short twenty years is believed to be the richest man on earth. But his fortune has benefited everybody. He has put the world on wheels. He has increased wages, and through him we see the real answer to the conundrum of wages and profits. In his *Life and Work* he continually protests that he never thinks about profits, and I for one believe him. He never tires of telling us that the first thing in industry is to get your principles right, and that the first principle is that of service to the community. Ford had brought the opportunity to ride in a car within the scope of millions of his fellow creatures; he has rendered service, and in return his fellow creatures reward him and his workers (and incidentally other workers in the same lines of business) with unparalleled profits and unprecedented wages.

Wealth, as I have previously observed, is an unlimited thing. There is any amount of it. We have only scratched the surface; we have merely experimented with our wealth-producing powers. If we will give up squabbling amongst ourselves and will cease to think about ourselves and get to work in the service of others, then—whether we like it or not, whether we want it or not—we shall secure both ever-increasing wages and ever-increasing profits. In Europe, and in England in particular, we have fallen into the error of devoting our thoughts entirely to ourselves as producers, forgetting the purpose of work, employment and profits; looking upon a job as an end in itself; talking about our rights instead of our responsibilities. For these reasons we are very properly, very naturally, and—as we shall one day see—very obviously going down hill.

C

Chemical Matters in Parliament

Dyes (Import and Export Regulations)

In a reply to Mr. Baker (House of Commons, May 28), who asked the President of the Board of Trade whether he could supply a statement giving the import and export regulations in regard to dyes in each of the principal producing countries, Mr. Lunn said he would have a statement giving such information as was available sent out as soon as possible.

Dyestuffs Imports, 1913 and 1923

Mr. Baker (House of Commons, May 30) asked the President of the Board of Trade the total imports of dyes into this country in 1913 and 1923, showing the quantities from each source of supply?

Mr. Lunn: The following statement shows the quantities of intermediate coal tar products used in the manufacture of dyes, etc., and finished dyestuffs obtained from coal tar, registered as imported into the United Kingdom from the several countries of consignment, during the year ended December 31, 1923.

Countries whence consigned.	Intermediate Coal Tar Products used in the manufacture of Dyes (including Aniline Oil and Salt, and Phenylglycine).	Finished Dyestuffs obtained from Coal Tar.		
		Alizarine.	Indigo Synthetic	Other Sorts.
	Cwts.	Cwts.	Cwts.	Cwts.
Sweden ..	—	—	—	16
Germany ..	267	8,198	8,274	25,179
Netherlands	10	7	—	60
Belgium ..	—	—	—	205
France ..	20	56	—	465
Switzerland	30	148	—	13,077
Italy ..	22	—	—	82
Austria ..	—	—	—	55
U.S.A. ..	1,000	—	—	39
British India	—	—	—	39
Canada ..	—	—	—	257
Total ..	1,249	8,409	8,274	39,474

From April 1, 1923, direct imports into the Irish Free State from foreign countries have been excluded.

Owing to changes in classification the particulars for 1923 are not strictly comparable with those given below for 1913.

The following statement shows the quantities of dyes and dyestuffs obtained from coal tar, registered as imported into the United Kingdom from the several countries of consignment, during the year ended December 31, 1913:

Countries whence consigned.	Alizarine and Anthracene Dyestuffs.	Aniline and Naphthalene Dyestuffs.	Synthetic Indigo.	Other Coal Tar Dyestuffs.
	Cwts.	Cwts.	Cwts.	Cwts.
Germany ..	60,315	258,629	23,888	147
Netherlands ..	18	634	1	—
Belgium ..	—	1,280	—	8
France	—	98	—	—
Switzerland ..	—	22,141	—	—
Italy	—	48	—	—
Austria-Hungary	480	17	—	—
U.S.A.	—	174	—	—
Total	60,813	283,027	23,889	155

Dyestuff Prices

Mr. Baker asked the President of the Board of Trade the prices of dyes in this country as compared with the prices in Germany, France, and the U.S.A. for the years 1913, 1920, 1921, 1922, and 1923.

Mr. Lunn: I regret that, in view of the number and varieties of dyestuffs on the market, the different strengths at which they are sold, and the fact that the larger consumers are often able to obtain special terms, the compilation of a detailed comparative statement is practically impossible, whilst any general statement would only be of very doubtful value.

Mr. Baker asked the President of the Board of Trade whether he would supply a statement showing the effects of the Dyestuffs Act on the cotton industry in this country?

Mr. Lunn: I do not think any general statement is practicable, but if my hon. Friend will indicate the particular points which he has in mind, I shall be glad to consider what information it is possible to supply.

Reparation Dyestuffs

Mr. Webb, President of the Board of Trade (House of Commons, June 3) in a reply to Mr. Black on reparation dyestuffs gave the following particulars.

The value of reparation dyestuffs received by the British Government since the commencement of deliveries is as follows:—Financial year: 1920-21, £549,094; 1921-22, £86,157; 1922-23, £301,390; 1923-24, £194,042.

The gross amounts received for the sales of dyestuffs were:—1920-21, £330,926; 1921-22, £370,721; 1922-23, £387,311; 1923-24, £343,661.

The total amounts of commission and all other charges incurred in disposing of the dyes (including freight from Germany and storage) were:—1920-21, £78,170; 1921-22, £52,449; 1922-23, £47,768; 1923-24, £40,001.

British Dyestuffs Corporation

Mr. Webb, President of the Board of Trade (House of Commons, June 3) in answer to questions by Lieut. Commander Kenworthy said that the members of the I.G. who would be parties to the proposed agreement were the Badische-Anilin und Soda-Frabrik, Friedrich Bayer and Co., the Berlin Aniline Co., Cassella and Co., the Griesheim-Elektron Co., Kalle and Co., Meister Lucius and Brüning and Weiler-ter-Meer. He added that as regards the suggested agreement, the terms had not been settled and he had not seen a copy. He only knew in general outline what the terms now under discussion were, and it was impossible to expect exact particulars of future agreements.

Position of the Swiss Dye Industry

THE Swiss dye industry has not benefited by the removal of German competition as a result of the war. In fact, except in 1920, according to a correspondent of the *Manchester Gtardian Commercial*, neither during nor since the war has Switzerland been able to export such quantities as were exported in 1913. During the four years from 1915 to 1918, when German goods were entirely eliminated from the markets, Swiss export figures showed an average of 4,975 tons, or only 68 per cent. of the pre-war exports. The German textile industry before the war was the best customer for Swiss aniline dyes, taking on an average 22 per cent. of the entire exports, which amounted to 6,700 metric tons a year. In 1923 Switzerland exported 4,339 tons of aniline dyes, 2,700 tons less than in 1913, in which year the German purchases amounted to 1,360 tons. Half of the loss compared with 1913 is in sales to Germany, which country now has an embargo on imports of aniline dyes.

Before the war Great Britain took 12 per cent. of the exports, during the war years 46 per cent., but in 1923 only 14 per cent. The United States before the war took 21 per cent., but in 1923 only 9 per cent.

The average value per kilo of Swiss dyes exported to those countries which are protecting their own industry is much above the general average, these countries importing only the best qualities. Swiss manufacturers are giving up the manufacture of those qualities whose prices leave too small a margin of profit. They do not, therefore, it is stated, advocate any protection of the home market against German competition, for it would not pay to manufacture at home the lower qualities, which are now imported.

Trade Openings in Canada

AN interesting visitor to this country is Mr. John A. Noonan, of the head office staff of the Royal Bank of Canada, Montreal, whose address here is the London headquarters at Bank Buildings, Princes Street, London, E.C.2.

In the past two or three years numerous inquiries have been received in Canada from British houses for information regarding the possibilities of establishing branch industries in the Dominion, and Mr. Noonan has come armed with a good deal of valuable information to be placed at the service of those who are interested in such projects. It covers such matters as power costs, shipping and transportation facilities, wages, location of respective towns and their principal industries, population, market prospects, and so forth—all indispensable to those firms who are contemplating an extension of their operations to Canada.

From Week to Week

DR. W. H. MILLS has been re-appointed University Lecturer in Organic Chemistry at Cambridge, and Mr. F. W. Dootson has been re-appointed lecturer in General Chemistry.

MR. J. R. PULLAR, head of the mathematical and science departments of Montrose Academy, has intimated his resignation after 35 years' service in the institution.

THE EXPORTS of Kenya Colony in 1923, dealt with in the annual report of the Trade Commissioner at Nairobi, include 31,762 tons of carbonate of soda from Lake Magadi, valued at £142,917.

A TALK WAS GIVEN from the London station of the British Broadcasting Co., on Wednesday, by Dr. H. B. Baker, F.R.S., Professor of Chemistry at the Imperial College of Science, on "The Progress of Chemistry."

MR. W. D. SCOTT, of University College, Oxford, has been elected to a Henry P. Davison Scholarship in Chemistry for the year 1924-25. He will continue his studies at Yale University, and return to Oxford to take his Honours School.

AT A GENERAL MEETING of the members of the Royal Institution, held on Monday, Dr. J. Mitchell Bruce, manager and vice-president (in the chair), Mr. S. Corner, Mr. F. Gill and Mr. G. W. Thompson were elected members.

THE DEGREE of D.Sc. in Chemistry has been conferred at London University on Mr. S. Sugden, of Birkbeck College, for a thesis entitled "The Measurement of Surface Tension and its Relation to Chemical Composition."

THE ROYAL COMMISSION on Awards to Inventors again sat in private in London on Monday, when the hearing was continued of the claims in respect of the alleged invention for the improvement in the manufacture of ammonium perchlorate.

DR. F. G. BANTING, discoverer of insulin, was married at Toronto, on Wednesday, to Miss Marion Robertson, who has been associated with him in his laboratory work. The bride is the daughter of Dr. William Robertson, a physician of Elora, Ontario.

MR. W. A. ALBRIGHT, of Edgbaston (of the firm of Albright and Wilson, chemical manufacturers), has presented to Oldbury Council the deeds of an extension to Barnford Hill Park, Langley. This park and Broadwell Recreation Ground were previous gifts of his to the town.

THE NUMBER FO PERSONS on May 26 recorded on the registers of Employment Exchanges in Great Britain was 1,015,600. This was 5,432 less than on May 19, 1924, and 270,023 less than on December 31, 1923. The total includes 754,500 men, 33,700 boys, 194,900 women, and 32,500 girls.

THE COAL OUTPUT from the mines of Great Britain during the week ended May 24 was 5,436,400 tons, as compared with 5,658,900 tons in the previous week and 3,737,000 tons in the corresponding week last year. The number of wage-earners in the week ended May 24 was 1,191,800.

THE INQUEST on Percy Wilkinson, who was killed by a fall of about 800 tons of slag whilst working for Tarmac, Ltd., at a Middlesbrough ironworks, was formally opened and adjourned on Friday, May 30. Two men who were buried along with Wilkinson by the slide, are making satisfactory progress towards recovery.

MR. HENRY WALKER, Deputy Chief Inspector of Mines, has been appointed Chief Inspector of Mines in succession to Sir Thomas Mottram, C.B.E., who is retiring on June 20, on reaching the age of 65. Mr. F. H. Wynne, Divisionary Inspector, York and North Midland Division, is to be Deputy Chief Inspector in place of Mr. Walker.

SIR MAX MUSPRATT, Lady Muspratt, and their daughter returned to Liverpool on Monday after a visit of nearly two months to Spain. Sir Max made an exhaustive tour of the United Alkali Company's mines, and enjoyed a ten days' rest in a remote district among the mountains, mixing a great deal with the people, and taking part in their religious processions.

INCLUDED in the King's Birthday Honours List are Dr. William Galloway, author of the coal dust theory of mine explosions, knighted for public services, Sir Charles Sherrington, President of the Royal Society, who receives the Order of Merit, and Col. Stuart William Hughes Rawlins, Commandant of the Chemical Warfare Station at Porton, who becomes a Companion of the Bath.

NEGOTIATIONS WHICH HAVE been in progress for some time for the amalgamation of William Shepherd and Sons, Ltd., of Rochdale, with the Tarmac Co., Wolverhampton, interested in the same class of business as road constructors, have now been broken off, the directors of Shepherds issuing a circular stating that the conditions which they were able to obtain were not commensurate with the interest of the company, and the have decided to carry on as a separate company.

A CONFERENCE on British Glass House Industries was held on Monday at Wembley, presided over by Mr. H. V. Taylor, Deputy Controller of Horticulture, Ministry of Agriculture. Dealing with the question of sterilisation of soil, Sir John Russell, director of Rothamsted Experimental Station, Harpenden, said that carbolic acid was very efficacious for the purpose, and it had the advantage of being nearly "fool-proof." Certain organisms in the soil fed on carbolic acid, which did not remain long enough in the soil to do harm, though harm could be caused if sufficient carbolic was used to suffocate, at it were, those organisms.

New Chairman of Wm. Gossage and Sons, Ltd.

Retirement of Mr. John Gray

MR. C. H. HAMILTON has been appointed Chairman of Wm. Gossage and Sons, Ltd., in succession to Mr. John Gray, who has been compelled to resign the position owing to ill-health. In connection with this change a very interesting presentation to Mr. Gray took place in the Company's board-room at Widnes. The meeting was presided over by Mr. C. H. Hamilton (the newly elected Chairman of the Company), who made feeling reference to the parting with Mr. Gray, and especially to the reason for his having to sever his connection with the Company.

Lord Leverhulme, on behalf of the Board of Wm. Gossage and Sons, Ltd., and Mr. Gray's former colleagues at Port Sunlight, presented him with a handsome solid silver tea service and tray.

Mr. Stirling (Secretary of the Company) also presented to Mr. Gray, on behalf of the senior managers of the company, a solid silver fruit and cake stand.

Contact Filtration in Petroleum Refining

OIL refiners in America are showing increased interest at the present time in the use of the so-called contact process in the decolourising of the lubricating oils, waxes and gasoline, by the use of fine fullers earth, rather than by the older method of using coarser fullers earth in percolating filters. Briefly, this process is to use either fine fullers earth—that is, earth ground to at least 80 per cent. minus 200—or to use acid-treated clays that are now being prepared on the Pacific Coast and are said to have higher decolourising power than the finely divided fullers earth. The process greatly simplifies the production of oil of a given colour and eliminates the large volume of oil formerly held in the process. It is reported that the Eastern oil refineries are just beginning to realise the advantages to be gained by using the contact process, whereas the mid-West and Pacific Coast refineries have been doing a great deal of research work and have put a number of plants into commercial operation on this basis.

Trade in Occupied Germany

MR. C. J. KAVANAGH, the Commercial Secretary in Occupied Germany, resident in Cologne, is at present in this country for the purpose of a short official visit. Mr. Kavanagh will be in attendance at the Department of Overseas Trade from June 2 to 13 inclusive, and will be pleased to interview British manufacturers and merchants interested in export trade to occupied territory of Germany.

Applications for interviews should be made at once to the Comptroller-General, Department of Overseas Trade, 35, Old Queen Street, London, S.W.1, the reference T.G 5358 being quoted in all cases.

References to Current Literature

British

CATALYSIS.—The catalytic decomposition of hydrogen peroxide solution by blood charcoal. J. B. Firth and F. S. Watson. *Trans. Faraday Soc.*, March, 1924, pp. 601–613.

ELECTRO-CHEMISTRY.—Oxidation and reduction potentials of organic compounds. E. Bülmann. *Trans. Faraday Soc.*, March, 1924, pp. 676–691.

The electro-deposition of manganese. Part I. A. J. Allmand and A. N. Campbell. *Trans. Faraday Soc.*, March, 1924, pp. 559–573.

The use of the lead cathode in the electrolytic method for the determination of minute quantities of arsenic. T. Callan. *J.S.C.I.*, May 30, 1924, pp. 168–170T.

SULPHONATION.—The sulphonation of glyoxalines. Part II. R. Forsyth, J. A. Moore and F. L. Pyman. *Chem. Soc. Trans.*, April, 1924, pp. 919–923.

ORGANIC SALTS.—Arylamine salts of the naphthalene sulphonic acids. Part I. The salts of 2 : 6- and 2 : 7-naphthalenedisulphonic acids. R. B. Foster and C. M. Keyworth. *J.S.C.I.*, May 30, 1924, pp. 165–168T.

COLLOIDS.—A method of measuring the rate of coagulation of colloidal solutions over wide ranges. H. H. Paine and G. T. R. Evans. *Trans. Faraday Soc.*, March, 1924, pp. 649–658.

An investigation of Smoluchowski's equation as applied to the coagulation of gold hydrosol. L. Anderson. *Trans. Faraday Soc.*, March, 1924, pp. 623–634.

The effect of sucrose on the rate of coagulation of a colloid by an electrolyte. L. Anderson. *Trans. Faraday Soc.*, March, 1924, pp. 635–648.

Kinetics of the process of coagulation of colloids in the light of Smoluchowski's theory. J. N. Mukherjee and S. K. Majumdat. *Chem. Soc. Trans.*, April, 1924, pp. 785–794.

The influence of anions on the coagulation of negatively charged suspensoids. J. N. Mukherjee and S. G. Chandhuri. *Chem. Soc. Trans.*, April, 1924, pp. 794–802.

NITRO COMPOUNDS.—Preparation of 2- and 4-nitro-1-naphthols. H. H. Hodgson and E. Kilner. *Chem. Soc. Trans.*, April, 1924, pp. 807–811.

British Dominions

FOODSTUFFS.—The chemistry of flour and bread making R. Harcourt. *Canad. Chem. Met.*, April, 1924, pp. 82–85

CORROSION.—The relation of hydrogen ion concentration to the corrosion of iron. J. W. Shipley and I. R. McHaffie. *Canad. Chem. Met.*, May, 1924, pp. 121–124.

ANALYSIS.—The colorimetric determination of platinum by potassium iodide. Part I. E. G. R. Ardagh, F. S. Seaborne and N. S. Grant. *Canad. Chem. Met.*, May, 1924, pp. 117–120.

United States

REFRIGERATION.—How plant conditions influence the choice of refrigerating machines. H. J. Macintire. *Chem. Met. Eng.*, May 19, 1924, pp. 791–793.

NITROGENOUS COMPOUNDS.—Chilean nitrate and organic nitrogen in the fixed nitrogen problem. H. A. Curtis. *Chem. Met. Eng.*, May 19, 1924, pp. 788–790.

OILS.—Problems in the refining of cracked distillates. J. C. Morrell. *Chem. Met. Eng.*, May 19, 1924, pp. 785–787.

TECHNOLOGY.—Heat transmission from bare and insulated pipes. R. H. Heilman. *J. Ind. Eng. Chem.*, May, 1924, pp. 451–458.

Characteristics of air-blast heaters. F. R. Ellis and J. D. White. *J. Ind. Eng. Chem.*, May, 1924, pp. 471–473.

Loss of heat from furnace walls. R. Calvert and L. Caldwell. *J. Ind. Eng. Chem.*, May, 1924, pp. 483–490.

Heat transfer in enamel-lined apparatus. E. P. Poste. *J. Ind. Eng. Chem.*, May, 1924, pp. 469–470.

The film concept of heat transmission applied to a commercial water heater. D. K. Dean. *J. Ind. Eng. Chem.*, May, 1924, pp. 479–483.

ACIDS.—The development of modern equipment for nitric acid production. F. C. Zeisberg. *Chem. Met. Eng.*, May 19, 1924, pp. 778–781.

The decomposition of dihydroxymaleic acid. A. Locke. *J. Amer. Chem. Soc.*, May, 1924, pp. 1246–1252.

CASEIN.—Chemistry of casein. L. L. Van Slyke. *Chem. Age (N. York)*, April, 1924, pp. 163–165.

METHYL ALCOHOL.—Methanol: its properties, manufacture and uses. Part II. R. F. Remler. *Chem. Age (N. York)*, April, 1924, pp. 159–161.

ARTIFICIAL RESINS.—The Albertol synthetic resins. Part I. E. Fonrobert and C. Marx. *Chem. Age (N. York)*, April, 1924, pp. 167–168.

SOLVENTS.—Toxicity of industrial solvents. E. Kohn-Abrest. *Chem. Age (N. York)*, April, 1924, pp. 199–201.

PLANT.—A new colloid mill. W. A. McLean. *J. Ind. Eng. Chem.*, May, 1924, pp. 494–497.

CARBONS.—Testing decolorising carbons. J. E. Teeple and P. Mahler. *J. Ind. Eng. Chem.*, May, 1924, pp. 498–500.

German

OILS.—The oxidation of petroleum by means of air. B. Tütünnikoff. *Z. angew. Chem.*, May 22, 1924, pp. 300–302.

The blowing of petroleum residues and tars. J. Marcusson and M. Picard. *Chem.-Zeit.*, May 22, 1924, pp. 338–339.

REACTIONS.—Action of nitric acid on mercury at various temperatures and in the presence of various catalysts. C. C. Palit and N. R. Dhar. *Z. anorg. u. allg. Chem.*, April 8, 1924, pp. 191–201.

The temperature coefficients of some reactions in the dark and in the light. R. C. Banerji and N. R. Dhar. *Z. anorg. u. allg. Chem.*, April 8, 1924, pp. 172–190.

SILICON COMPOUNDS.—The silicon analogue of calcium cyanamide. L. Wöhler and O. Bock. *Z. anorg. u. allg. Chem.*, April 8, 1924, pp. 221–250.

ADSORPTION.—The determination of the adsorption of gases and gas mixtures. R. Lorenz and E. Wiedbrauck. *Z. anorg. u. allg. Chem.*, April 8, 1924, pp. 251–264.

AMMONIA SYNTHESIS.—The ammonia synthesis at high pressures. W. Moldenhauer. *Chem.-Zeit.*, April 15, 1924, pp. 233–234.

ANALYSIS.—The determination of tetrathionate by means of sulphite. A. Kurtenacker. *Z. anorg. u. allg. Chem.*, April 8, 1924, pp. 265–268.

The estimation of the relative proportions of nitric oxide and nitrogen dioxide in a mixture containing these gases. A. Klemenc and K. Muha. *Z. anorg. u. allg. Chem.*, April 8, 1924, pp. 208–220.

Separation of cadmium from zinc by precipitation as sulphide from potassium cyanide solution. K. Chalupny and K. Breisch. *Chem.-Zeit.*, May 27, 1924, pp. 349–351.

Anthocyanine as an indicator in acidimetry. V. Matula. *Chem.-Zeit.*, May 10, 1924, pp. 305–306.

The estimation of iodine in iodides. J. Weichherz and Z. Klinger. *Chem.-Zeit.*, April 29, 1924, pp. 269–270.

CHLORINE COMPOUNDS.—Aktivin, a new form of active chlorine. R. Feibelmann. *Chem.-Zeit.*, May 8, 1924, pp. 297–299.

PHOSGENE.—Pyrogenic formation of phosgene. E. Biesalski. *Z. angew. Chem.*, May 29, 1924, pp. 314–317.

COLOUR.—The quinonoid formation. W. Dilthey. *Z. angew. Chem.*, May 29, 1924, pp. 313–314.

ORGANO-METALLIC COMPOUNDS.—Some compounds of the diethylarsine series. N. I. Wigren. *Annalen*, May 20, 1924, pp. 285–296.

Compounds of alkyl magnesium halides with carbonyl bodies and the reducing action of the Grignard reagent. K. Hess and W. Wustrow. *Annalen*, May 20, 1924, pp. 256–273.

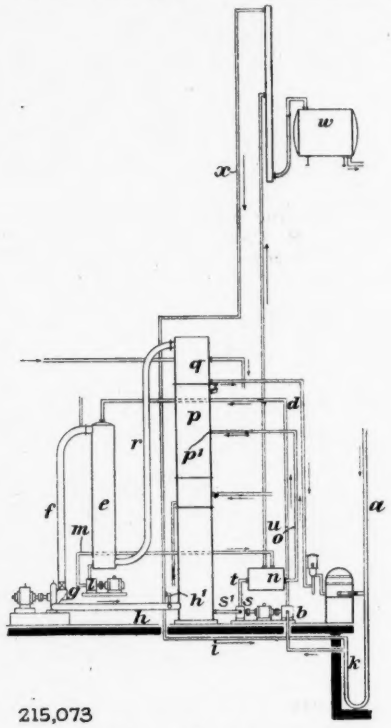
ACIDS.—3 : 4 : 5-Trioxy-cinnamic acid and the mechanism of Knoevenagel's cinnamic acid synthesis. K. W. Rosenmund and T. Boehm. *Annalen*, May 12, 1924, pp. 125–147.

Patent Literature

Abstracts of Complete Specifications

215,073. Distillation Installations, Solvent Recovery Plants and Similar Installations for the Recovery of Liquids by Heat Treatment. F. A. Hughes and Co., Ltd., 1 and 3, Regent Street, London, S.W.1. From H. Schmidt, 71, Amsterdamerstrasse, Cologne, Germany. Application date, January 30th, 1923.

The apparatus is suitable for the recovery of vapours such as benzol from coke oven gas, or volatile solvents in the rubber and other industries. Such vapours are usually absorbed by means of another liquid having a higher boiling point, and then heating the latter liquid to distil off the volatile liquid. In such apparatus, the absorption liquid is usually conveyed by pumps the output of which is controlled by means of floats in accordance with the quantity of liquid passing through the apparatus. In this invention the pump output is not controlled, but air, gas or vapour is supplied to make up the deficiency of liquid. The liquid—*e.g.*, mineral oil containing

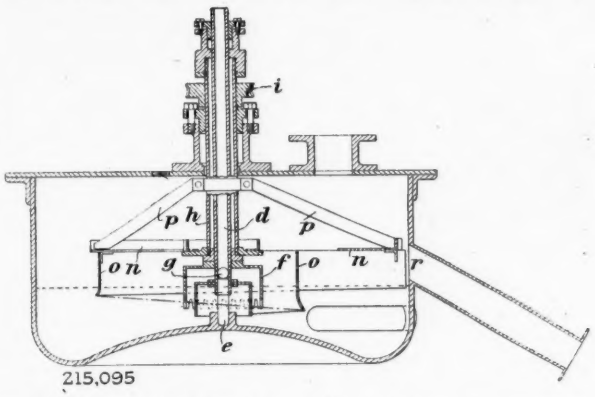


215,073

benzol—passes through a conduit *a* to a pump *b*, thence through a conduit *d* to a washing column *e*. Air passes from the latter through a pipe *f*, fan *g*, and pipe *h* to the distillation column *p*, but part of this air passes through pipes h^1, *i* to a point *k* on the suction side of the pump *b*, the quantity being dependent on the supply of liquid to the pump. The liquid passes downwards through the column *e* in counter-current to the air, so as to extract any remaining vapour. The liquid passes through a pipe *m* to a heat interchanger *n*, and thence through a pipe *o* to the column *p* at p^1. Any air which also enters the column passes through the cooler *q* and pipe *r* to the washing column *e*. The absorption agent is withdrawn through the pipe s^1, pump *s*, heat interchanger *n*, pipe *u*, to an elevated tank *w*. Any air which accompanies this liquid passes through pipe *x* to the bottom of the distillation column *p*.

215,095. Removal of Matter from the Surface of a Liquid, particularly in Working Apparatus for Heat Treatment by Means of Molten Metal. Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd., and Sir A. M. Duckham, 52, Grosvenor Gardens, London, S.W.1. Application date, February 2, 1923.

This apparatus is applicable for the distillation of tar oil, etc., by means of molten metal as described in Specification No. 170,617 (see The Chemical Age, Vol. V., p. 708). In such apparatus it has been found that free carbon, ash, or other finely divided material tends to accumulate on the surface of the metal and thus reduces the efficiency of heat transmission to the liquid on the surface, and in this invention the solid deposit is removed by means of a relatively moving blade. A tube *d* is supported at *e* in the bottom of the still, and carries a hood *f* with serrated lower edge. The tar is forced through an opening *g* into the hood, and thence through the serrations into the molten metal. The upper part of the hood supports a hollow shaft *h*, driven through a worm wheel *i*,



215,095

and the lower end of the shaft carries radial arms *n* supporting a depending blade *o* of spiral form, which is also provided with ties *p*. The rotation of the blade *o* forces the floating material to the circumference of the still, from which it passes to a discharge opening *r*. In another arrangement, the lower edge of the spiral blade may be just in contact with the molten metal, and may have stirring arms depending into the metal. In another arrangement, the spiral blade may be stationary and the metal may be caused to rotate by means of a rotating paddle immersed in it.

215,069. Gas, Apparatus for the Manufacture of. W. J. Mellersh-Jackson, London. From the Western Gas Construction Co., Fort Wayne, Ind., U.S.A. Application date, January 30, 1923.

Apparatus for the manufacture of water gas which is enriched with oil vapour, usually have hand operated valves for controlling the air blast and steam in the desired sequence. In this invention the control valves of the gas production cycle are operated in the desired sequence and timing by a unitary power operated device, comprising a reversible distributor which directly controls the distribution of hydraulic pressure medium to the valves. The power operated device may be controlled to vary the time intervals between successive actuations of the valves, and the distributor is automatically reversed. The apparatus is described in detail.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention: 193,834 (Farbwerke vorm. Meister, Lucius and Brüning) relating to the manufacture of azodyestuffs, see Vol. VIII., p. 494; 198,346 (Soc. de Recherches et de Perfectionnements Industriels, and E. B. G. Bascou) relating to the recovery of oil contained in a mixture of pulverised substance with water and oil, see Vol. IX., p. 156; 198,374 (J. N. A. Sauer) relating to a process for purifying and decolorising sugar solutions, see Vol. IX., p. 130; 200,789 (Naugatuck Chemical Co.) relating to the vulcanisation of rubber, see Vol. IX., p. 319; 201,570 (J. Chatelan) relating to the vulcanisation of rubber and gutta percha, see Vol. IX., p. 350; 203,310 (Soc. of Chemical Industry in Basle) relating to manufacture of resins, see Vol. IX., p. 494; 206,469 (Bakelite Ges. and R. Hessen) relating to condensation products of phenols and formaldehyde, see Vol. X., p. 72; 206,487 (F. Hoffmann-La Roche and Co. Akt.-Ges.) relating to manufacture of emulsions of bismuth salts, see Vol. X., p. 72; 208,162 (Durand and Huguenin Akt.-Ges.) relating to disazo dyestuffs, see Vol. X., p. 175; 209,379 (Koppers Co.) relating

to treatment of ammonia-charged gas, see Vol. X., p. 250; 210,382 (Koppers Co.) relating to removal of hydrogen sulphide from gases, see Vol. X., p. 334.

215,098. Straining or Filtering Apparatus. F. C. Fulcher, 1A, New London Street, London, E.C.2. Application date, February 3, 1923.

This filtering apparatus is applicable for treating liquids or gases. A casing 1 contains four filters arranged in two sets, each comprising two filters arranged end to end. The internal wall 4 separates the inlet 2 from the outlet 3, and directs the fluid downwards so that it rises between the two sets of filters. Each filter set is mounted on a rotating shaft 12, which carries a number of discs 17. Each disc has a central hole 18 to fit the shaft, and two sets of holes 19, 20 arranged alternately.

Fig. 2

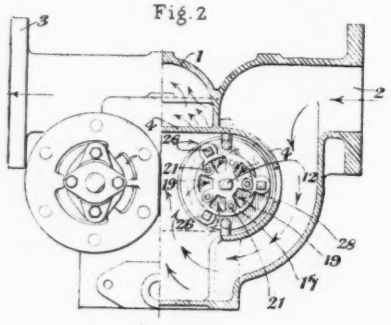
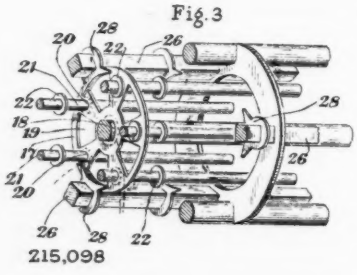


Fig. 3



215,098

Rods 21 pass through the holes 20, and carry washers 22 to separate slightly the adjacent discs, while the openings 19 in the discs form continuous conduits. The two filters of each set are pressed apart by a spring. Rods 26 are arranged parallel to the shaft, and carry scraper blades 28 between each adjacent pair of discs. The fluid to be filtered passes radially inwards between the discs to the ducts 19, and thence through passages 11 at the end of the casing to the outlet 3. The periphery of the filter becomes coated with solid material, which is removed by rotating the filter blades relatively to the scraper 28. The apparatus is arranged so that each shaft 12 carrying its pair of filters may be withdrawn as a unit from the casing. An alternative method of constructing and mounting the filters is also described.

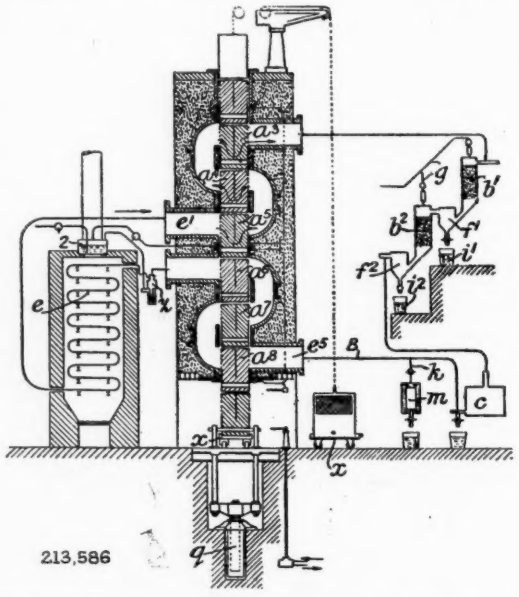
International Specifications not yet Accepted

213,571. Ammonia Oxidation. G. Kassner, 39, Nordstrasse, Münster, Westfalia, Germany. International Convention date, March 31, 1923.

A mixture of lead oxide and an oxide of manganese, vanadium, molybdenum, chromium, tungsten or uranium, with one or more alkaline earths, is heated and ammonia vapour and air passed over it. Other compounds of lead, manganese, barium, calcium or strontium, such as hydrates, carbonates, peroxides, nitrates, nitrides, hydrides, or organic compounds, may alternatively be used. Examples of such mixtures are (1) calcium, strontium or barium orthoplumbate with an oxide of magnanese; (2) calcium, strontium, or barium metaplumbate with calcium, strontium or barium manganate or manganite; (3) barium orthoplumbate with molybdenum trioxide, vanadium pentoxide, tungstic acid, uranium trioxide, or chromic acid; (4) lead oxide with barium carbonate or nitrate and manganese dioxide. Plumbates, manganates and manganites are formed during the oxidation. The mixture may be heated to 250°–500° C., and the nitrogen oxides formed are absorbed by the alkaline earths to form nitrates. These nitrates are dissolved out at intervals with water, and fresh alkaline earth is added. The process may be carried on continuously by heating to 500°–750° C., so that the alkaline earth nitrates are continually decomposed. The nitrogen oxides may be absorbed in dry sodium or potassium carbonate, caustic soda or soda lime, and the remaining gases subjected to wet absorption.

213,586. Distillation of Fuel. H. Dupuy, 27, rue du Banquier, Paris. International Convention date, March 29, 1923. Addition to 198,661.

The fuel is contained in skips having two opposite openwork sides, which are raised from a trolley x to the top of a vertical shaft. The column of skips is lowered by a jack q and the lowest skip removed in turn. Steam from a boiler 2 and



superheater e passes through a conduit e^1, and then upwards through the skips, a^5, a^4, a^3, to condensers, b^1, b^2, tar separators f^1, f^2, and receivers, i^1, i^2. The gases pass through a pipe B and conduit e^5, to the lower series of skips, a^8, a^7, a^6, where they are heated and the fuel cooled. The periods of heating and cooling of the fuel are equal.

213,590. Emulsions. H. Bechhold, L. Gutlohn and H. Karplus, Institut für Kolloidforschung, Theodor Stern-Kai, Frankfort-on-Main, Germany. International Convention date, March 29, 1923.

A substance to be emulsified is mixed with an aliphatic or sulphonated aliphatic acid of high molecular weight such as oleic acid, stearic acid, or sulphonated ricinoleic acid, and dissolved in tetrahydronaphthalene, liquid paraffin, or oil of turpentine. The solution is mixed with an alkaline solution in proportion less than the equivalent of the acid—e.g., with caustic alkalies, alkali carbonates, ammonia, alkali borates. In an example, an emulsion is formed from paraffin wax, oleic acid, paraffin oil, and soda lye; also thymol and naphthalene with oleic acid, turpentine oil, and soda lye.

213,593. Dyeing Cellulose Acetate. J. R. Geigy, Soc. Anon., 51, Reihenring, Basle, Switzerland. International Convention date, March 31, 1923.

Cellulose acetate fibres are treated with aromatic sulphonic or carboxylic acids or their salts, such as the sulphonic acids of benzene, naphthalene, or anthracene, or salicylic acid, or oxy, alkyl, chlor, or nitro derivatives of these. This treatment may be preliminary to dyeing, or these substances may be mixed with the dye bath or printing paste. As an example, methylene green may be mixed with sodium diphenylamine sulphonate or carbazole sulphonic acid.

213,599. OBTAINING ACIDS. A. F. Meyerhofer, 10, Goethestrasse, Zürich, Switzerland. (Assignee of E. De Haen Akt.-Ges., Seelze, near Hanover, Germany.) International Convention date, March 28, 1923.

Organic or inorganic salts are treated with hydrofluoric or a complex hydrofluoric acid to liberate the corresponding acid. The salts should be such that the metal gives an insoluble or difficultly soluble compound with the complex hydrofluoric acid, and that the acid radical exists as a gas. Sodium chloride may be mixed with hydrofluosilicic acid, and the sodium fluosilicate filtered off, leaving hydrochloric acid. Sodium formate and hydrofluosilicic acid yield formic acid and sodium bisulphate and hydrofluoric acid yield sulphuric acid. The components of the complex hydrofluoric acid may be used—*e.g.*, titanium fluoride and hydrofluoric acid, where the free acid does not exist. Double fluorides containing zirconium, which are otherwise difficult to produce, may thus be obtained.

213,881. PURIFYING MINERAL OILS. Union Oil Co. of California, Los Angeles, Cal., U.S.A. (Assignees of R. C. Pollock, Union Oil Refinery, Wilmington, Cal., U.S.A.) International Convention date, April 4, 1923.

Gasolene is decolorised by treating with sulphuric acid of 50–98 per cent. strength and decolorising clay simultaneously.

213,886. CONCENTRATING RUBBER LATEX. K.D.P., Ltd., 7, Gracechurch Street, London. (Assignees of M. S. Stutchbury, 7, Gracechurch Street, London.) International Convention date, April 5, 1923.

Raw or vulcanised latex is evaporated with a protective colloid, with or without an anticoagulant. Suitable colloids are gelatine, glue, gum arabic, saponin, casein, albumen, alkaline albuminates or their decomposition products, and anticoagulants are alkaline sulphites, iodides or rhodanides.

213,889. DYES. H. Pereira, 3, Freyung, Vienna. International Convention date, April 7, 1923.

Benzoyl derivatives of dioxyperylene, such as dibenzoyl dioxyperylene, are treated with aluminium chloride, and the product extracted with dilute hydrochloric acid, and then purified by vatting with sodium hydrosulphite and alcohol and precipitated by blowing in air. The dyestuff dyes cotton blue shades.

LATEST NOTIFICATIONS.

216,478. Process for preparing a reaction product of acetaldehyde and aniline. Naugatuck Chemical Co. May 26, 1923.
216,486 Manufacture of lakes. Farbenfabriken vorm. F. Bayer and Co. May 22, 1923.
216,499. Manufacture of persulphuric acid and of solutions of persulphuric acid salts. Oesterreiche Chemische Werke Ges. May 22, 1923.
216,514. Refractory product and process for making the same. Babcock and Wilcox Co. May 25, 1923.
216,515. Kaolin refractory and process of making the same. Babcock and Wilcox Co. May 25, 1923.
216,527. Manufacture of azo dyestuffs. Chemische Fabrik Griesheim-Elektron. May 22, 1923.

Specifications Accepted with Date of Application

193,401. Heating and smelting furnaces. Eisen-und Stahlwerk Hoesch Akt.-Ges. February 14, 1922.
195,382. Zinc, Process and apparatus for the manufacture of. Dunford and Elliott (Sheffield), Ltd., and A. H. Pehrson. March 21, 1922.
213,939–40. Reactivating decolorising carbon, Process of. Algemeene Norit Maatschappij and J. N. A. Sauer. May 26, 1922.
215,496. Gas from coal or from coal and oil, Manufacture of. E. Neath. February 14, 1923.
215,796. India rubber, Vulcanisation of. Dunlop Rubber Co., Ltd., and D. F. Twiss. June 25, 1923.
215,802. Oxidised ores or other oxidised compounds of copper and zinc, Treatment of. G. W. Edwards and H. T. Durant. November 20, 1922.
215,810. Alumina and glass-making salts, Apparatus and method of producing. R. L. Frink. January 15, 1923.
215,812. Drying processes. T. Rigby. January 18, 1923.
215,813. Phosphoric acid, Manufacture of. B. Laporte, Ltd., and H. E. Alcock. January 18, 1923.
215,845. Briquetting of ores. W. H. Beasley, E. Edser, and Minerals Separation, Ltd. February 17, 1923.
215,872. Electrolysing fused salts of metals, Apparatus for—and recovering the metals and acid radicles. E. A. Ashcroft. February 27, 1923. Addition to 198,024.
215,929. Emulsions, Process for the prevention of the formation of. H. A. Gill. (*Sharples Specialty Co.*) April 16, 1923.
215,935. Magnetic separation of materials, Process and apparatus for. P. C. Rushen. (*F. Krupp Akt.-Ges. Grusonwerk.*) April 25, 1923.
216,001. Cleaning gases, more particularly producer gases, Method of. Lodge-Cottrell, Ltd. (*Metallbank und Metallurgische Ges. Akt.-Ges.*) July 2, 1923.
216,021. Gasification of bituminous coal and the like. Humphreys and Glasgow, Ltd. (*J. M. Rusby.*) August 2, 1923.
216,022. Gas, Manufacture of. Humphreys and Glasgow, Ltd. (*P. T. Dashiell.*) August 3, 1922.

Applications for Patents

Baird, R. T., and Corthesy, J. H. Distillation of liquid hydrocarbons. 13,261. May 29.
Beckett, E. G., and Scottish Dyes, Ltd. Dyeing. 12,911. May 26.
Calvert, G. Synthetic production of liquid hydrocarbons. 13,374. May 31.
Carbide and Carbon Chemicals Corporation and Marks, E. C. R. Partial oxidation of gaseous hydrocarbons. 12,915. May 26.
Carpmael, W., and Chemische Fabrik auf Actien vorm. E. Schering. Manufacture of compounds of 4-amino-2-argentomercaptobenzene-1-carboxylic acid and alkali salts thereof. 13,345. May 30.
Collett, E., and Synthetic Ammonia and Nitrates, Ltd. Catalysts for synthesis of ammonia. 13,167. May 29.
Collett, E., and Synthetic Ammonia and Nitrates, Ltd. Production of hydrogen. 13,168. May 29.
Courtaulds, Ltd., and Weyenbergh, E. van. Preparation of alkali celluloses. 13,334. May 30.
Electro Metallurgical Co. and Marks, E. C. R. Welding and brazing copper, etc. 12,916. May 26.
Holloway, J., and North British Diesel Engine Works (1922), Ltd. Centrifugal separators. 12,854. May 26.
Internationale Bergin-Compagnie voor Olie-en Kolen-Chemie. Process of treating carbon and hydrocarbons. 13,095. May 28. (Germany, May 31, 1923.)
Lilienfeld, L. Manufacture of artificial materials. 13,353. 13,354. 13,356. 13,359. May 30. (Austria, April 4.)
Lilienfeld, L. Manufacture of cellulose derivatives. 13,355. 13,357. 13,358. May 30. (Austria, April 4.)
MacKay, H. S. Electrochemical treatment of copper ores, etc 13,253. May 29.
Mulligan, F. Manufacture of hydraulic cement, etc., from gypsum. 13,048. May 28.
Roessler and Hasslacher Chemical Co. and Ellis, G. B. Electrolysis. 13,140. May 28.
Society of Chemical Industry in Basle. Manufacture of substantive azo dyestuffs. 13,360. May 30. (Switzerland, July 27, 1923.)

London Chemical Works Liquidation

THE petition of Henry Ellison, Ltd., manufacturing chemists, of Cleckheaton, Yorkshire, for the compulsory liquidation of the London Chemical Works, Ltd., came before Mr. Justice Romer in the Winding-Up Court on Tuesday.

Mr. Cecil Turner said the petitioners were judgment creditors, and a resolution for a voluntary winding-up was passed on the eve of the petition coming on for hearing. The petition had been adjourned to ascertain what passed at the creditors' meeting, at which the liquidator presided, and what happened was that a resolution to adjourn the meeting for a month was defeated.

Mr. Draper said he opposed the petition on behalf of the holders of £15,000 debentures, who had appointed a receiver. It would be disastrous to the goodwill of the company's business, he said, if the company was wound up.

His Lordship: I never believe that. Why is a winding-up more disastrous to the goodwill than the appointment of a receiver?

Mr. Mawle, for the company, said that no prejudice was alleged, and he would agree to the appointment of a joint liquidator by the petitioners.

His Lordship said an additional liquidator was appointed, and the petition was dismissed.

Valuable Mercurial Dyestuff

A MERCURY compound in the form of a red dye has produced remarkable results on apparently hopeless cases of blood poisoning, according to reports from the division of medicinal products of the American Chemical Society.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

London, June 5, 1924.

BUSINESS has been slowing down during the past week consequent upon the holiday season, but on the whole the tendency is fairly healthy.

Export demand is very quiet.

General Chemicals

ACETONE is almost unobtainable for spot delivery but in forward positions the market is easier.

ACID ACETIC is firm and active market. Several lower offers have been in evidence during the week.

ACID CITRIC is unchanged.

ACID FORMIC is in fair demand and the price is firm.

ACID LACTIC is without special feature.

ACID OXALIC.—Rather better business is reported, and the fall in price seems to have been arrested.

BARIUM CHLORIDE is in fair demand. The price seems very low and a larger volume of business would probably send the price upwards.

COPPER SULPHATE is unchanged.

CREAM OF TARTAR seems likely to again advance in price, but the demand is strong.

FORMALDEHYDE is lower in price.

LEAD ACETATE.—The price has been reduced and now more fully discounts the fall in lead.

METHYL ALCOHOL is weak consequent upon realisations by an important foreign holder. The other makers will not follow suit and an improvement in the market at any moment is not impossible.

POTASSIUM CARBONATE AND CAUSTIC are unchanged.

POTASSIUM PERMANGANATE.—The tendency is in buyers' favour.

POTASSIUM PRUSSIATE is lifeless, and a further reduction in price may be expected.

SODA ACETATE is firm and active market.

SODA BICHROMATE is unchanged.

SODA HYPOSULPHITE is unchanged.

SODA NITRITE is in good demand, supplies for early delivery are scarce.

SODA SULPHIDE is unchanged.

Coal Tar Intermediates

There is little change to report for this market during the last week, a fair business being maintained in a number of products, while export inquiry is moderate.

ALPHA NAPHTHOL is quiet at last quoted price.

ALPHA NAPHTHYLAMINE.—Some home trade business has been placed and the price is firm.

ANILINE OIL AND SALT.—A moderate business is passing.

BENZIDINE BASE continues in fair demand for home trade.

BETA NAPHTHOL has been inquired for in the home market.

DIMETHYLANILINE is quiet without change in value.

" H " ACID .—The usual demand has been received.

NITRO BENZOL is of interest on both home and export account, without change in value.

PARANITRANILINE is without special feature.

" R " SALT continues on quiet lines.

RESORCINE is of interest on home account.

XYLIDINE is without change.

Pharmaceutical Chemicals

ACETYL SALICYLIC ACID is in fair demand, price unchanged. There is an improved export inquiry.

ACID SALYCYLIC is irregular, cheap export offers being made from the Continent.

BROMIDES continue to be sold here below the parity of Continental makers' prices, but the general tendency is somewhat firmer.

COCAINE.—An improvement is not unlikely.

HEXAMINE tends to harden.

PHENACETIN is higher on the spot.

PHENAZONE is in fair request, also for export. Price unchanged.

PHENOLPHTHALEIN is in buyers' favour, the demand being poor.

SODA SALICYLATE is steady and sells readily.

VANILLIN is firm.

Coal Tar Products

The market for coal tar products generally is quiet, and there is little change to report since last week.

90% BENZOL remains steady at 1s. 6d. to 1s. 7d. per gallon on rails.

PURE BENZOL is quiet at 1s. 11d. per gallon on rails.

CREOSOTE OIL remains very weak, with little business being done. It is worth about 7d. per gallon on rails in the North for prompt delivery, but rather less for forward, while the price in London is from 8d. to 8¼d. per gallon.

CRESYLIC ACID remains steady, and makers are comfortably sold. The pale quality, 97/99%, is being offered at about 2s. 0¼d. to 2s. 1d. per gallon on rails in the North, while the dark quality, 95/97%, is scarce, and remains unchanged at 1s. 9d. per gallon.

SOLVENT NAPHTHA remains very firm at 1s. 3d. per gallon on rails.

HEAVY NAPHTHA is unchanged from last week, and is quoted at 1s. 2d. to 1s. 3d. per gallon on rails.

NAPHTHALENES are quiet, with little change from last week. The low quality is offered at £6 to £6 10s. per ton, 74/76 melting point at about £7 per ton, and 76/78 melting point at about £7 10s. per ton.

PITCH is dull. To-day's values are more or less nominal at about 60s. f.o.b. London, and 55s. to 60s. at other ports.

Possibility of Synthetic Foodstuffs

DR. F. GOWLAND HOPKINS (Sir William Dunn Professor of Bio-Chemistry in the University of Cambridge) delivered the Huxley lecture at the University of Birmingham on Wednesday, May 28. Discussing the present situation and the future outlook of bio-chemistry, Professor Hopkins said the lay public had not yet understood bio-chemistry. The science had great economic importance. The progress of bio-chemistry had accelerated of late to a degree that was striking, and much of that was due to the development of the technique of bio-chemistry. It would be easy to speculate, for example, upon a world in which bio-chemical synthesis replaced agriculture; indeed as soon as the constitution of three or four vitamins became known there was no reason why we should not begin to set about the synthesis of a perfect dietary. In his opinion, bio-chemical science would in the future have much more to say concerning the details of nutrition. If industrialism increased while the available fertile areas of the globe steadily decreased mankind would best save itself by knowing all it could about economies and the betterments which bio-chemical science alone could provide.

Oxygen Works for Belfast

PLANS are understood to have been completed for the opening of an oxygen plant in Belfast. It will be known as the Irish Oxygen Works and will be situated in the vicinity of the big shipyards. At present the enormous quantity of oxygen used in the shipyards is imported from Liverpool and Glasgow, but with the new venture this will not be necessary. In addition, the large consignments of scrap metal sent from Belfast to England and Scotland to be cut will be kept in Belfast to be dealt with. Between 200 and 300 men, mostly skilled, will be employed at the new works, which will soon be in operation.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, June 4, 1924.

THERE has been a rather better outlook in the heavy chemical market during the past week, inquiries being better and a fairly satisfactory number of orders being obtained. Prices for home products are on the whole steady, with Continental still showing signs of advance in some articles.

Industrial Chemicals

ACID ACETIC.—Prices remain unchanged. Glacial, 98/100% now quoted £61 to £69 per ton; 80% pure, £49 to £51. per ton; 80% technical, £46 to £48 per ton. All packed in casks delivered, c.i.f. U.K. port duty free.

BORACIC.—Crystals or granulated, £48 per ton; powdered, £50 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC ICE CRYSTALS.—Still in poor demand. Quoted 6¾d. per lb. carriage paid, or f.o.b. U.K. port, but could probably be obtained for less.

ACID CITRIC B.P. CRYSTALS.—Unchanged at about 1s. 6¼d. per lb., less 5% ex store, spot delivery. Offered for early delivery at slightly less.

ACID FORMIC 85%.—Quoted £63 per ton, ex store. 80% quality on offer at £57 10s. per ton, ex store, spot delivery.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC 80°.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC.—Spot material unchanged at about 4¾d. per lb. ex store, but very little demand. Still on offer from the Continent at about 4¼d. per lb., c.i.f. U.K. port.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton ex works, full truck loads. Dearsenicated quality 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 2¾d. to 1s. 2¾d. per lb., less 5% ex store, with demand fairly good. Offered for early delivery at about 1s. 1½d. per lb., less 5% ex wharf.

ALUMINA SULPHATE, 17/18% Iron free.—Quoted £7 15s. per ton, ex store, spot delivery. Offered for early delivery at about £7 2s. 6d. per ton, c.i.f. U.K. port.

ALUM CHROME.—Ammonium chrome alum quoted £19 to £21 per ton, according to quality, f.o.b. U.K. port; potash chrome alum of English manufacture about £26 5s. per ton, ex store; Continental potash chrome alum offered at about £25 10s. per ton, c.i.f. U.K. port.

ALUM POTASH (LUMP).—Unchanged at £10 10s. per ton, ex store, spot delivery. Offered from the Continent at about £9 10s. per ton, c.i.f. U.K. port.

AMMONIA ANHYDROUS.—Unchanged at about 1s. 5½d. per lb., ex station, prompt delivery.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered U.K.

AMMONIA LIQUID 880°.—Unchanged at 2½d. to 3d. per lb., delivered, according to quantity. Containers extra.

AMMONIA MURIATE.—Grey galvanisers quality of English manufacture quoted £30 per ton, ex station. Fine white crystals of Continental manufacture on offer at £25 15s. per ton, c.i.f. U.K. port, prompt shipment. Spot lots about £28 per ton, ex store.

AMMONIA SULPHATE.—25¼%, £13 12s. per ton; 25¾% neutral quality, £14 15s. per ton, ex works, prompt delivery.

ARSENIC, WHITE POWDERED.—Makers again reduce price for forward delivery. Quoted £51 per ton, ex wharf. Continental on offer at about £48 per ton, c.i.f. U.K. port.

BARIUM CARBONATE 98/100%.—Continental material offered at £11 5s. per ton, c.i.f. U.K. port, prompt shipment.

BARIUM CHLORIDE 98/100%.—English material unchanged at about £14 per ton, ex store. Offered from the Continent at about £13 5s. per ton, c.i.f. U.K. port.

BARYTES.—Finest English white quoted £5 5s. per ton, ex works. Continental about £5 per ton, c.i.f. U.K. port.

BLEACHING POWDER.—Spot lots £11 per ton, ex station. Contracts 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystals £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. per ton, ex station. Continental quoted £5 5s. per ton, c.i.f. U.K. port.

COPPERAS GREEN.—Unchanged at about £2 5s. per ton, f.o.b. U.K. port in bulk. Quoted £3 5s. to £3 10s. per ton, in casks.

COPPER SULPHATE.—Good inquiry for export. Quoted £23 10s. per ton, f.o.b. U.K. port.

FORMALDEHYDE 40%.—Spot lots still on offer at about £61 per ton, ex store.

GLAUBER SALTS.—English material quoted £4 per ton, ex store or station. Continental on offer at about £3 10s. per ton, c.i.f. U.K. port.

LEAD, RED.—Unchanged at about £35 10s. per ton, ex store for good quality continental material.

LEAD, WHITE.—Quoted £42 10s. per ton, ex store, spot delivery.

LEAD ACETATE.—White crystals quoted £48 10s. per ton, ex store, spot delivery. On offer from the Continent at about £47 5s. per ton, c.i.f. U.K. port. Brown crystals offered from the Continent at £43 5s. per ton, c.i.f. U.K. port.

MAGNESITE CALCINED.—English ground material offered at £8 per ton, ex station. Moderate inquiry for export.

MAGNESIUM CHLORIDE.—Continental offers advanced to about £3 10s. per ton, c.i.f. U.K. port. Spot lots available at £4 per ton, ex store.

MAGNESIUM SULPHATE (EPSOM SALTS).—English material quoted £4 15s. per ton, ex store, spot delivery. B.P. quality on offer at about £6 5s. per ton, ex station.

POTASH CAUSTIC 88/92%.—Spot lots unchanged at about £31 to £31 10s. per ton, ex store. Offered from the Continent at £29 15s. per ton, c.i.f. U.K. port.

POTASSIUM BICHROMATE.—Unchanged at 5¾d. per lb. delivered.

POTASSIUM CARBONATE.—Spot lots of 96/98% quality on offer at about £26 15s. per ton, ex store. Quoted £24 15s. per ton, c.i.f. U.K. port, prompt shipment from the Continent.

POTASSIUM CHLORATE.—Moderate inquiry quoted 3½d. per lb., ex store.

POTASSIUM NITRATE (SALTPETRE).—Quoted £27 10s. per ton, c.i.f. U.K. port prompt shipment. Spot lots unchanged at about £30 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—In fair demand. Quoted 8¾d. to 9d. per lb., ex store, spot delivery. Commercial quality about 7¾d. per lb., ex store, spot delivery. B.P. crystals offered from the Continent at 7½d. per lb., c.i.f., U.K. port.

POTASSIUM PRUSSIATE (YELLOW).—Moderate inquiry for export. Quoted 8½d. per lb., f.o.b. U.K. port. Spot lots on offer at about the same price, ex store.

SODA CAUSTIC.—76/77%, £19 7s. 6d. per ton; 70/72%, £17 17s. 6d. per ton; 60/62%, broken, £19 2s. 6d. per ton; 98/99%, powdered, £22 15s. per ton. All ex station spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Still in little demand, quoted £25 per ton ex store. Offered from the Continent at about £23 15s. per ton, c.i.f. U.K. port.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—English makers' prices unchanged at 4¾d. per lb., d/d.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton ex quay or station. Alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material unchanged at £10 per ton, ex station. Continental offered at about £9 per ton, c.i.f. U.K. port. Pea crystals of English manufacture quoted £13 15s. per ton, ex station.

SODIUM NITRATE.—95/96% quoted £13 10s. per ton, f.o.r. or f.o.b. U.K. port; 96/98% quoted 7s. 6d. per ton extra.

SODIUM NITRITE, 100%.—Unchanged at £28 per ton, f.o.b. U.K. port in little demand.

SODIUM PRUSSIATE (YELLOW).—English material quoted 4½d. per lb. f.o.b. U.K. port. Continental offered at slightly less, c.i.f. U.K. port.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption £3 10s. per ton, carriage paid buyers' station. Good inquiry for export and price about £3 per ton, f.o.b. U.K. port.

SODIUM SULPHIDE.—60/65% solid, English make, £14 15s. per ton ex station; broken, £1 per ton more; flake, £2 per ton more; 60/62%, solid, offered from the Continent at £12 10s. per ton, c.i.f. U.K. port; broken, £1 per ton more; 31/34% crystals, English make, £9 2s. 6d. per ton ex station; 30/32% crystals, Continental make, £8 12s. 6d. per ton, c.i.f. U.K. port.

SULPHUR.—Flowers, £10 per ton; roll, £9 per ton; rock, £9 per ton; ground, £8 per ton. Prices nominal.

ZINC CHLORIDE, 98/100%.—Quoted £26 15s. per ton, f.o.b. U.K. port.

ZINC SULPHATE.—English material quoted £13 10s. per ton, ex station. Offered from the Continent at about £11 per ton, c.i.f. U.K. port.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHYLAMINE.—Export inquiry. Price 1s. 4d. lb., f.o.b.

BENZIDINE BASE.—Export inquiry. Price 4s. 6d. lb., 100% basis, f.o.b.

DIANISIDINE BASE.—Several export inquiries. Price 2s. 6d. lb., 100% basis.

META PHENYLENEDIAMINE.—Home inquiry. Price 4s. 6d. lb., delivered.

META NITRANILINE.—Some export inquiry. Price 5s. 3d. lb.

PARA NITRO ORTHO TOLUIDINE.—Export inquiry. Price 5s. lb.

PARA PHENYLENEDIAMINE.—Small home inquiries. Price 10s. 3d. lb., 100% basis.

R SALT.—Home inquiry. Price quoted 2s. 6d. lb., 100% basis.

AMIDOAZOBENZOL.—Some export inquiry. Price 2s. 9d. lb.

AMIDOAZOTOLUOL.—Export inquiry. Price 4s. 1½d. lb.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at sellers' works.

General Heavy Chemicals

Business is maintained at a satisfactory level with a fair export business and very steady values.

Acid Acetic 40% Tech.—£23 10s. per ton.

Acid Hydrochloric.—3s. 6d. to 6s. per carboy d/d., according to purity, strength and locality.

Acid Nitric 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 65s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.

Bleaching Powder.—Spot, £11 d/d.; Contract, £10 d/d. 4 ton lots.

Bisulphite of Lime.—£7 per ton, packages extra.

Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)

Calcium Chloride.—£5 17s. 6d. per ton d/d.

Potash Caustic.—£30 to £33 per ton.

Potassium Bichromate.—5¾d. per lb.

Potassium Chlorate.—3d. to 4d. per lb.

Salammoniac.—£32 per ton d/d.

Salt Cake.—£3 10s. per ton d/d.

Soda Caustic, Solid.—Spot lots delivered, £16 7s. 6d. to £19 7s. 6d. per ton, according to strength; 20s. less for contracts.

Soda Crystals.—£5 5s. to £5 10s. per ton ex railway depots or ports.

Sodium Acetate 97/98%.—£24 per ton.

Sodium Bicarbonate.—£10 10s. per ton carr. paid.

Sodium Bichromate.—4½d. per lb.

Sodium Bisulphite Powder 60/62%.—£18 to £19 per ton according to quantity, f.o.b., 1-cwt. iron drums included.

Sodium Chlorate.—3d. per lb.

Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton ex Liverpool. Nominal.

Sodium Nitrite 100% basis.—£27 per ton d/d.

Sodium Sulphide conc. 60/65.—About £14 10s. per ton d/d.

Sodium Sulphide Crystals.—£9 per ton d/d.

Sodium Sulphite, Pea Crystals.—£15 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—6½d. to 7d. per lb. Demand quiet. Crude 60's, 1s. 9d. to 1s. 10d. per gall. Market flat, only odd lots being offered.

Acid Cresylic 97/99.—2s. 1d. to 2s. 3d. per gall. Demand still good. Market firm. Pale 95%, 1s. 10d. to 1s. 11d. per gall. Steady demand. Dark, 1s. 8d. to 1s. 11d. per gall. Steady business.

Anthracene Paste 40%.—4d. per unit per cwt. Nominal price No business.

Anthacene Oil, Strained.—9½d. per gall. Very quiet. Unstrained. 8½d. to 9d. per gall.

Benzol.—Crude 65's.—10 d. to 1s. per gall. ex works in tank wagons. Standard Motor, 1s. 4½d. to 1s. 6d. per gall. ex works in tank wagons. Pure, 1s. 8½d. to 1s. 10d. per gall. ex works in tank wagons.

Toluol.—90%, 1s. 5½d. per gall. Pure, 1s. 10d. to 2s. per gall.

Xylol Commercial.—2s. 3d. per gall. Pure, 3s. 3d. per gall.

Creosote.—Cresylic 20/24%, 9d. to 9½d. per gall. Few inquiries. Middle Oil, Heavy and Standard Specification, 7½d. to 9d. per gall. according to grade and district. Fair demand.

Naphtha.—Crude, 8d. to 9d. per gall. Solvent 90/160, 1s. 4d. to 1s. 5d. per gall. Market steady. Solvent 90/190, 1s. 2d. to 1s. 3d. per gall. Fair business passing.

Naphthalene Crude.—Drained Creosote Salts, £6 to £6 10s. Demand falling off. Whizzed or hot pressed, £9 to £12 per ton. More inquiry.

Naphthalene.—Crystals and Flaked, £17 to £18 per ton.

Pitch.—Medium soft, 52s. 6d. to 57s. 6d. per ton. Market steadier. Few inquiries for forward delivery. Very little business for prompt.

Pyridine.—90/160, 21s. 6d. to 22s. per gall. Demand well maintained. Heavy, 12s. to 12s. 6d. More business passing.

Intermediates and Dyes

Business in dyestuffs has improved slightly during the week. Deliveries are still only required in very small quantities owing to the desire of consumers to keep stocks down. Prices remain unaltered.

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 6d. per lb.

Acid H.—4s. 4d. per lb. 100% basis d/d.

Acid Naphthionic.—2s. 4d. per lb. 100% basis d/d.

Acid Neville and Winther.—5s. 8d. per lb. 100% basis d/d.

Acid Salicylic, technical.—1s. 2d. to 1s. 3d. per lb. Steady demand.

Acid Sulphanilic—10d. per lb. 100% basis d/d.

Aluminium Chloride, anhydrous.—1s. per lb. d/d.

Aniline Oil.—7¾d. to 8¼d. per lb. naked at works.

Aniline Salts.—7¾d. to 9d. per lb. naked at works.

Antimony Pentachloride.—1s. per lb. d/d.

Benzidine Base.—4s. 6d. per lb. 100% basis d/d.

Benzyl Chloride 95%.—1s. 3d. per lb.

p-Chlorphenol.—4s. 3d. per lb. d/d.

p-Chloraniline.—3s. per lb. 100% basis.

o-Cresol 19/31° C.—4¾d. to 5¼d. per lb. Demand moderate.

m-Cresol 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.

p-Cresol 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.

Dichloraniline.—3s. per lb.

Dichloraniline S. Acid.—2s. 6d. per lb. 100% basis.

p-Dichlorbenzol.—£75 per ton.

Diethylaniline.—5s. per lb. d/d., packages extra, returnable.

Dimethyaniline.—2s. 4d. per lb. d/d. Drums extra.

Dinitrobenzene.—9d. per lb. naked at works.

Dinitrochlorbenzol.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. 2d. per lb. naked at works.
Diphenylamine.—3s. per lb. d/d.
Monochlorbenzol.—£63 per ton.
B Naphthol.—1s. 1d. per lb. d/d.
a-Naphthylamine.—1s. 4½d. per lb. d/d.
B-Naphthylamine.—4s. per lb. d/d.
m-Nitraniline.—5s. 3d. per lb. d/d.
p-Nitraniline.—2s. 4d. per lb. d/d.
Nitrobenzene.—5¼d. to 5½d. per lb. naked at works.
o-Nitrochlorbenzol.—2s. per lb. 100% basis d/d.
Nitronapthalene.—11¾d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100 % basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. 2d. per lb. d/d.
p-Phenylene Diamine.—10s. 4d. per lb. 100% basis d/d.
R. Salt.—2s. 5d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 6d. per lb. 100% basis d/d.
o-Toluidine.—8½ per lb.
p-Toluidine.—3s. 6d. per lb. naked at works.
m-Toluylene Diamine.—4s. 6d. per lb. d/d.

Wood Distillation Products

There are no alterations to report in the markets for wood distillation products.

Acetate of Lime.—Brown, £14 10s. per ton d/d. Demand active. Grey, £19 to £20 per ton. Liquor, 9d. per gall. 32° Tw.
Charcoal.—£7 5s. to £9 per ton, according to grade and locality. Market steady.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 7d. per gall. Unrefined.
Wood Naphtha.—Miscible, 5s. to 5s. 3d. per gall. 60% O.P. market stiffer. Solvent, 5s. 6d. to 6s. per gall. 40% O.P. Fairly good demand but little offering.
Wood Tar.—£5 per ton.
Brown Sugar of Lead.—£49 per ton.

Rubber Chemicals

There are no alterations in the market to be reported.

Antimony Sulphide.—Golden, 5¾d. to 1s. 4d. per lb., according to quality. Crimson, 1s. 3d. to 1s. 6d. per lb., according to quality.
Arsenic Sulphide, Yellow.—1s. 11d. per lb.
Barytes.—£3 10s. to £16 15s. per ton, according to quality.
Cadmium Sulphide.—3s. 9d. per lb.
Carbon Bisulphide.—£24 to £26 per ton according to quantity.
Carbon Black.—6¼d. to 6¾d. per lb. Market firmer.
Carbon Tetrachloride.—£56 per ton, drums free.
Chromium Oxide, Green.—1s. 3d. per lb.
Indiarubber Substitutes, White and Dark.—4¾d. to 6¼d. per lb. Demand very brisk. Prices likely to remain steady owing to firmness of rapeseed oils.
Lamp Black.—43s. 6d. per cwt., barrels free.
Lead Hyposulphite.—7½d. per lb.
Lithopone, 30%.—£22 10s. per ton.
Mineral Rubber "Rubpron."—£15 10s. per ton f.o.r. London.
Sulphur.—£10 to £12 per ton, according to quality.
Sulphur Chloride.—3d. per lb., carboys extra.
Thiocarbanilide.—2s. 9d. per lb.
Vermilion, Pale or Deep.—5s. 1d. per lb. Much dearer, following rise in quicksilver.
Zinc Sulphide.—7½d. to 1s. 8d. per lb., according to quality.

Pharmaceutical and Photographic Chemicals

Acid, Acetic 80% B.P.—£48 per ton.
Acid, Acetyl Salicylic.—3s. 3d. to 3s. 5d. per lb. In good demand.
Acid, Benzoic B.P.—3s. 9d. per lb. Larger supplies available.
Acid Boric B.P.—Crystal £54 per ton, Powder £58 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 6¼ per lb., less 5% for ton lots. Market extremely firm. Upward tendency.
Acid, Gallic.—3s. per lb. for pure crystal. Market very steady.
Acid, Pyrogallic, Crystals.—7s. per lb. for 1 cwt. lots. Market firm; increasing demand.
Acid, Salicylic.—Prices quoted from 2s. per lb. down to 1s. 9d. for ton lots. Market weak.
Acid, Tannic B.P.—3s. per lb. Market quiet.
Acid, Tartaric.—1s. 1½d. per lb., less 5%. Much firmer with more demand. Upward tendency.
Amidol.—9s. per lb. d/d.
Acetanilide.—2s. 3d. per lb. for quantity. Stocks are small.
Amidopyrin.—13s. 6d. per lb. Neglected. Stocks low.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb. according to quantity.
Ammonium Carbonate B.P.—£37 per ton.
Atropine Sulphate.—12s. per oz. for English make.
Barbitone.—15s. 6d. per lb. Quiet market.
Benzonaphthol.—5s. 6d. per lb. Small inquiry.
Bismuth Salts.—A steady market. Prices according to quantity.
Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.
Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.
Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.
Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Fluctuating market. Continental prices decidedly firmer. Potassium, 11d. per lb.; sodium, 1s. per lb.; ammonium, 1s. 1d. per lb.
Calcium Lactate.—Demand active. Good English make can be had from 1s. 7d. to 2s. 6d. per lb.
Chloral Hydrate.—3s. 10d. per lb., duty paid.
Chloroform.—2s. per lb. for cwt. lots. Market more active. Makers busy.
Creosote Carbonate.—6s. 6d. per lb. Little demand.
Formaldehyde.—£57 per ton, ex works. English make.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 50%, 2s. 6d. per lb.
Guaiacol Carbonate.—12s. per lb. for cwt. lots. Supplies not plentiful.
Hexamine.—3s. 9d. per lb. for English make. Market dull.
Homatropine Hydrobromide.—30s. per oz.
Hydroquinone.—4s. 3d. per lb. in cwt. lots. Foreign make.
Hypophosphites.—Calcium, 3s. 6d. per lb. for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—2s. 1d. to 2s. 5d. per lb., according to quantity. Advanced by 2d. per lb.
Magnesium Carbonate.—Light Commercial, £36 per ton net.
Magnesium Oxide.—Light Commercial, £75 per ton, less 2½%; Heavy Commercial, £26 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d per lb., according to quantity. Steady market.
Menthol.—A.B.R. recrystallised B.P., 60s. per lb. Weaker. Synthetic, 26s. to 35s. per lb., according to quantity. English make. Steady demand.
Mercurials.—Market firm. Red oxide, 5s. 3d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 6d. to 3s. 7d. per lb.; white precipitate, 4s. 7d. to 4s. 8d. per lb.; Calomel, 3s. 11d. to 4s. per lb.
Methyl Salicylate.—2s. 3d. to 2s. 9d. per lb. for carboys. A slightly better market.
Metol.—11s. per lb. British make.
Paraformaldehyde.—3s. 6d. per lb. Better inquiry.
Paraldehyde.—1s. 4d. to 1s. 6d. per lb. in free bottles and cases. Better demand.
Phenacetin.—6s. per lb.
Phenazone.—7s. 3d. per lb. for cwt. lots. Quiet.
Phenolphthalein.—6s. 9d. to 7s. 3d. per lb. In more plentiful supply.
Potassium Bitartrate 99/100% (Cream of Tartar).—88s. per cwt., less 2½% for ton lots. Firm market. Prices have upward tendency.
Potassium Citrate.—1s. 10d. to 2s. 2d. per lb. Dearer.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Demand continues.
Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included.
Potassium Permanganate.—B.P. crystals, 8¾d. to 9d. per lb., carriage paid; commercial, 8d. to 8¼d. per lb., carriage paid.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—5s. 6d. per lb.
Saccharin.—63s. per lb. in 50-lb. lots.
Salol.—3s. 6d. per lb. Very quiet.
Silver Proteinate.—9s. 6d. per lb.
Sodium Benzoate, B.P.—2s. 6d. per lb. In steady demand for good qualities.
Sodium Citrate, B.P.C., 1923.—2s. to 2s. 3d. per lb., according to quantity. Much firmer in common with other citrates. Prices advanced by 3d. per lb.
Sodium Hypophosphite, Photographic.—£14 to £15 per ton, according to quantity, d/d. consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb. Less for quantity.
Sodium Potassium Tartrate (Rochelle Salt).—77s. 6d. to 81s. 6d. per cwt., according to quantity. Market quiet.
Sodium Salicylate.—Market easier. Powder, 2s. 3d. to 2s. 6d. lb. Crystal, 2s. 6d. to 2s. 8d. per lb. Flake, 2s. 9d. to 3s. per lb.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb., according to quantity.
Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity, 1 cwt. kegs included. In large casks £1 per ton less.
Thymol.—15s. per lb. for good white crystal from ajowan seed. Very firm and scarce.

Perfumery Chemicals

Acetophenone.—12s. 6d. per lb.
Aubepine.—14s. 6d. per lb.
Amyl Acetate.—2s. 9d. per lb.
Amyl Butyrate.—6s. 9d. per lb. Cheaper.
Amyl Salicylate.—3s. 3d. per lb.
Anethol (M.P. 21/22° C.).—4s. 6d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—3s. 3d. per lb.
Benzyl Alcohol free from Chlorine.—3s. 3d. per lb.
Benzaldehyde free from Chlorine.—3s. 6d. per lb.
Benzyl Benzoate.—3s. 6d. per lb.
Cinnamic Aldehyde Natural.—15s. 6d. per lb.
Coumarin.—20s. per lb.
Citronellol.—16s. per lb.
Citral.—10s. per lb.
Ethyl Cinnamate.—15s. per lb.
Ethyl Phthalate.—3s. 3d. per lb. Reduced.
Eugenol.—11s. per lb.
Geraniol (Palmarosa).—35s. per lb.
Geraniol.—11s. to 18s. 6d. per lb.
Heliotropine.—6s. 6d. per lb. Reduced.
Iso Eugenol.—15s. 9d. per lb.
Linalol ex Bois de Rose.—28s. 6d. per lb. Reduced.
Linalyl Acetate.—28s. 6d. per lb. Reduced.
Methyl Anthranilate.—9s. 6d. per lb.
Methyl Benzoate.—6s. per lb.
Musk Ambrette.—48s. 6d. per lb. Reduced.
Musk Xylol.—16s. 6d. per lb. Reduced.
Nerolin.—4s. per lb.
Phenyl Ethyl Acetate.—12s. 6d. per lb.
Phenyl Ethyl Alcohol.—16s. per lb.
Rhodinol.—57s. 6d. per lb.
Safrol.—1s. 10d. per lb.
Terpineol.—2s. 9d. per lb.
Vanillin.—25s. 3d. to 26s. 6d. per lb.

Essential Oils

Almond Oil, Foreign S.P.A.—15s. 6d. per lb.
Anise Oil.—3s. per lb.
Bergamot Oil.—18s. 6d. per lb.
Bourbon Geranium Oil.—36s. 6d. per lb. Advanced.
Camphor Oil.—75s. per cwt.
Cananga Oil, Java.—10s. 6d. per lb.
Cinnamon Oil, Leaf.—6½d. per oz.
Cassia Oil, 80/85%.—9s. 3d. per lb.
Citronella Oil.—Java, 85/90%, 6s. per lb. Again dearer. Ceylon, 3s. 9d. per lb.
Clove Oil.—7s. 6d. per lb.
Eucalyptus Oil, 70/75%.—2s. 2d. per lb.
Lavender Oil.—French 38/40% Esters, 27s. 6d. per lb.
Lemon Oil.—3s. 2d. per lb.
Lemongrass Oil.—3d. per oz.
Orange Oil, Sweet.—13s. 9d. per lb.
Otto of Rose Oil.—Bulgarian, 27s. 6d. per oz. Anatolian, 23s. 6d. per oz.
Palma Rosa Oil.—19s. per lb.
Peppermint Oil.—Wayne County, 21s. 9d. per lb. Japanese, 18s. 3d. per lb.
Petitgrain Oil.—10s. per lb.
Sandal Wood Oil.—Mysore, 26s. 6d. per lb. Australian, 21s. per lb.

Chemical Trade Inquiry

The following inquiry, abstracted from the "Board of Trade Journal," has been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the name and address of the inquirer by applying to the Department (quoting the reference number and country), except where otherwise stated.

SULPHATE OF COPPER AND SULPHUR.—A firm of agents at Nantes is desirous of obtaining the representation of British firms for the sale in France of sulphate of copper and sulphur. Reference No. 656.

Tariff Changes

GERMANY. — Natural phosphate of lime (phosphorite, aparite, coprolite, navassit, somberit, and Iceland guano) are now exempt from import licence requirement.

ICELAND.—Soap, soap flakes and washing powders are included in a list of articles for which it is announced the import permits will only be granted in special circumstances.

SWEDEN.—New customs and excise duties have been imposed on imported benzine and sulphite spirit.

The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, June 5, 1924.

THE condition of the Manchester chemical market is still dull, and no improvement in the demand can be reported this week. Buying operations continue on a relatively small scale and business both on home and foreign account is restricted. Trade with the Continent is very quiet, most of the inquiry for shipment being for the Colonies. Prices in many cases still show an easy tendency, and several quotable changes from last week have taken place.

Heavy Chemicals

Saltcake is offering at £3 10s. per ton to home users and £3 f.o.b. for export; the recent cut in prices has made little appreciable difference in the demand for this material. Prussiate of soda is fairly steady but no business of importance is being placed. Chlorate of soda has met with a moderate demand at 2¾d. to 2¾d. per lb. Sodium sulphide is quiet but without change in price; 60 to 65 per cent. concentrated solid is offering at £14 10s. to £14 15s. per ton and crystals at £9 10s. Nitrite of soda is rather inactive and easier at £27 to £27 10s. per ton. Bleaching powder sells slowly, although values are steady at about £10 per ton. Glauber salts are quotably unchanged at £3 10s. per ton; buying Interest, however, is subdued. Compared with most other iines caustic soda is relatively in good demand; prices are steady and range from £16 17s. 6d. per ton for 60 per cent. strength to £19 7s. 6d. for 76 to 77 per cent. Alkali is in moderate inquiry for home and export, prices to domestic users keeping steady at £6 15s. per ton for 58 per cent. material. Hyposulphite of soda is dull at £14 10s. to £14 15s. per ton for photographic crystals and £9 10s. for commercial quality. Bichromate of soda is unchanged in position or value at 4½d. per lb. Phosphate of soda is quiet though steady at £13 10s. to £14 per ton. Bicarbonate of soda is in moderate inquiry at £10 10s. per ton. Soda crystals are still quoted at £5 5s. per ton, without attracting much attention from buyers. Acetate of soda is inactive at £23 10s. to £24 per ton.

Neither caustic potash nor carbonate is selling very freely, although quotations are steady; caustic is currently offered at round £30 per ton for 90 per cent. and carbonate at £23 to £24. Chlorate of potash is still quoted at about 2¾d. per lb., but business in this material is on quiet lines. Yellow prussiate of potash is easier at 8d. per lb., the demand being slow. Permanganate of potash meets with only a small sale, but values are maintained at from 7¼d. to 8d. per lb. according to quality. Bichromate of potash is steady and in fair inquiry at 5¾d. per lb.

Arsenic has given way further on a very restricted demand, and the pressure of offers of foreign material at considerably lower rates, white powdered, Cornish makes, now being offered at £54 to £55 per ton in Manchester. Copper sulphate is selling only in comparatively small quantities, although values are maintained at £24 10s. to £25 per ton, f.o.b. Commercial Epsom salts are quiet but steady at £4 15s. per ton, with magnesium sulphate, B.P., quoted at £6 10s. Grey acetate of lime is in poor demand at round £19 per ton; brown, however, is rather scarce and prices are unchanged at £14 10s. to £15 per ton. White acetate of lead is steadier at about £48 per ton; brown is quoted at £47 to £48. Nitrate of lead is dull at £44 per ton.

Acids and Tar Products

There has been no change in the prices of most of the acids, which, with the exception of oxalic, are well maintained. Tartaric is quoted at about 1s. 2d. per lb. and citric at 1s. 6d. Oxalic acid is featureless at 5d. per lb. Acetic acid is in moderate request at £48 for 80 per cent. technical and £70 per ton for glacial.

The coal-tar products generally are practically lifeless, the demand being very quiet. Carbolic acid crystals are easy at about 7¼d. per lb., with crude more or less nominal at 1s. 9d. to 2s. per gallon. Pitch is inactive at round £3 per ton, f.o.b. Naphthalines are offering at from £6 per ton for crude kinds and about £16 for refined; the demand for this material is restricted. Creosote oil is weak at 7½d. per gallon. Solvent naphtha is now on offer at about 1s. 5d. per gallon.

Company News

UTAH COPPER CO.—A dividend of £1 has been declared, payable on June 30.

NAMAQUA COPPER CO.—The accounts for the year 1923 show a profit of £21,407, which reduces the debit balance to be carried forward to £9,094.

PINCHIN, JOHNSON AND CO.—The directors have declared the usual dividend at the rate of 6½ per cent. per annum, less tax, on the preference shares for the six months to June 30, payable on July 1.

WALL PAPER MANUFACTURERS, LTD.—An interim dividend is announced at the rate of 4 per cent. for the financial year ending August 31, 1924, on the ordinary shares. A year ago the interim payment was the same.

FULLER'S EARTH UNION.—The accounts show that the net profits for the year ended March 31 were £14,963. A dividend of 15 per cent. is proposed, adding £5,256 to the reserve, and carrying forward £762.

UNITED PREMIER OIL AND CAKE CO., LTD.—A final dividend of 5 per cent. is recommended on the ordinary shares for the year to December 31, 1923. The ordinary general meeting will be held in London on June 17.

SANITAS CO.—The accounts for the year ended March 31 show a balance to the credit of profit and loss account of £49,207, against £31,295 in the previous year. A final dividend of 25 per cent. is proposed on the ordinary shares, making 30 per cent. for the twelve months.

SAN PATRICIO NITRATE CO.—The report for the year 1923 states that after providing stoppage expenses, usual administration charges, and income-tax, there is a profit of £4,443, and £5,582 was brought in, making £10,025. A dividend of 6d. per share, free of tax, is recommended, which will absorb £2,500.

THE BLEACHERS' ASSOCIATION, LTD.—A further dividend is announced at the rate of 15 per cent., making 20 per cent. for the year. The directors place £125,000 to general reserve and £371,884 is carried forward, against £361,712 brought in. The annual meeting will be held in the Memorial Hall, Albert Square, Manchester, on June 20, at noon.

Increased Chinese Demand for Fertilisers

DURING 1923, China imported 37,000 tons of fertilisers, valued at approximately £500,000, or more than double the imports for the year previous. Of this amount, the United States supplied the greatest quantity with 41 per cent., followed by Great Britain with 40 per cent. and Japan 11 per cent. Small importations were made during the year from Belgium, Germany and Denmark. It may be noted that in the period 1920-1922 the British share in this trade tended to diminish. In 1920, Great Britain supplied 56 per cent.; Japan, 30 per cent.; United States, 7 per cent. In 1921, Great Britain, 36 per cent.; Japan, 24 per cent.; United States, 16 per cent. In 1922, Great Britain, 27 per cent.; Japan, 24 per cent.; United States, 37 per cent. It is estimated that consumption of fertilisers during 1924 will be considerably greater than the past year, as the use of fertilisers is said to be becoming more and more popular.

Argentine Customs Tariff

THE Department of Overseas Trade has received a copy of the English and Spanish version of the Argentine Customs Tariff in its present form, compiled and translated by Mr. George Wilson-Rae, of Buenos Aires. The volume may be consulted by British exporters at the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1; and it is understood that copies may be obtained through Messrs. Gordon and Gotch, Ltd., 15, St. Bride Street, London, E.C.4, who are the sale agents in London.

One of the principal features of the publication is the model Customs clearing liquidations, made out by Mr. Colin Campbell, a well-known Custom House broker, which not only explains clearly the way in which Customs duties are charged in the Argentine, but also facilitate the checking of such liquidations, when that may be advisable.

New Chemical Trade Marks

Applications for Registration

"PETROLITE."

443,155. For paints, colours, varnishes and enamels. Class 1. A. H. Davis, Ltd., Maguire Street Paint Mills, 25 to 39, Maguire Street, Liverpool, paint manufacturers. November 30, 1923.

"BRENITE."

446,633. For chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. Frederic Auber Menzies, 42, Chester Terrace, Sloane Square, London, S.W.1, mine owner. March 21, 1924.

"NAGANOL BRAND."

446,356. For chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. Adam Calderwood Henry, 19, St. Dunstan's Hill, London, E.C.3, fine chemical merchant. March 14, 1924. (To be Associated, Sect. 24.)

"DAZLO."

446,204. For chemical substances prepared for use in medicine and pharmacy. Tokalon, Ltd., 212 to 214, Great Portland Street, London, W.1, manufacturing chemists. March 12, 1924. (To be Associated, Sect. 24.)

"NAGANOL BRAND."

446,357. For chemical substances prepared for use in medicine and pharmacy. Adam Calderwood Henry, 19, St. Dunstan's Hill, London, E.C.3, fine chemical merchant. March 14, 1924. (To be Associated, Sect. 24.)

Sponge Iron as a Chemical Precipitant

SPONGE iron is valuable as a chemical reagent, particularly in precipitating copper and lead from leaching solutions, and could be used to advantage in the western mining districts of the United States for this purpose if it could be produced cheaply enough. As a precipitant for metals, sponge iron forms a part of the programme of the U.S. Bureau of Mines, Department of the Interior, for the saving of waste from low-grade and complex ores. Sponge iron will precipitate lead from cold brine solutions and, for reasons of its great surface, is particularly efficacious in removing the last of the valuable constituents in liquors to be wasted. It may also be used as a precipitant for copper, and its possible metallurgical uses are too numerous to mention. In connection with the volatilisation process, it may be used to treat the chloride fume. As these valuable products are recovered in metallic form, they are, for the most part, high in grade and easy to treat. The small producer favours precipitants of this nature, as they are simple to use and involve no great first cost for plants. Much work, however, remains to be done by the Bureau of Mines on the complete utilisation of sponge iron as a chemical precipitant.

Methods of Testing Detonators

THE results of an investigation of various methods of testing detonators, made by Mr. C. A. Taylor, explosives chemist, and Mr. C. E. Munro, chief explosives chemist, United States Department of the Interior, tend primarily to emphasise the value of the sand test as a satisfactory method for estimating the strength and efficiency of industrial detonators and for fixing standards by which different types of detonators may be judged. As detonators of new compositions such as lead nitride or trinitroresorcinate are put on the market, a series of tests on each different brand can easily establish limits wherein each new type may be classified. Where detonators are to be tested in ordinary lots, or in commerce, where a general classification rather than a precise chemical determination is desired, the sand test method affords the simplest means by which this can be carried out. Its simplicity and the ease with which it may be operated mark its superiority and assure its practicability. Its efficiency may be somewhat impaired by the occurrence of variables of different natures; but this may be remedied to a great extent by standardisation of materials and conditions of operation.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

WEBB, Charles, 34, Braunton Road, Liverpool, chemical manufacturer. (C.C., 7/6/24.) £101 3s. 8d. April 24.

WOODBROOK DRUG CO., Vale Place, Merridale Street, Wolverhampton, chemists. (C.C., 7/6/24.) £19 0s. 6d. April 28.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

KANSAS-OKLAHOMA OIL AND REFINERY CO., LTD., London, E.C. (M., 7/6/24.) Registered May 23, £30,000 first debenture stock and premium of 10 per cent. (secured by Trust Deed, dated May 21, 1924), present issue £11,831; charged on all share capital held by company in Kentucky Oil Co., incorporated in State of Delaware, U.S.A., also general charge. The company also covenants to procure that the Kentucky Oil Co. will specifically charge its oil leases in Ohio County and Hancock County, Kentucky, U.S.A. *Nil. October 23, 1923.

London Gazette

Company Winding Up Voluntarily

CHESHIRE GLUE AND CHEMICAL COMPANY, LTD. (C.W.U.V., 7/6/24.) J. C. Bladen, Albion Street, Hanley, chartered accountant, appointed liquidator. Meeting of creditors at the Royal Hotel, Crewe, on Thursday, June 12, at 2 p.m. Creditors' claims by June 27.

Notice of Intended Dividend

PRESCOTT, Alfred, trading as PRESCOTT AND CO., Rutland Mills, Oswald Street, Hulme, Manchester, Drake Street, Manchester, Holt Town, Manchester, and Mill Bank Chemical Works, Triangle, Halifax, Yorks, chemical and aniline dye manufacturer. Second and final dividend 1s. 7⅞d. per £, payable June 2, Webb and Hall, chartered accountants, 90, Deansgate, Manchester.

Partnership Dissolved

ROBERT McBRIDE AND CO. (Robert McBRIDE, John McBRIDE, and Annie GREEN), bleachers and dyers, Monton Lane Dye Works, Eccles, near Manchester, by mutual consent as from December 31, 1923, so far as regards R. McBride, who has retired from the firm. Debts received and paid by J. McBride and A. Green, who will continue the business under the same style as heretofore, in conjunction with Robert McBride, junior, who has joined the firm.

ROBERT McBRIDE (Robert McBRIDE, John McBRIDE, and Robert McBRIDE, junior), bleachers and dyers, Burton Dye Works, Middleton, near Manchester, by mutual consent as from June 30, 1923, so far as regards R. McBride, who hae retired from the firm. Debts received and paid by J. McBrids and R. McBride, junior, who will continue the business.

SUTU VALET SERVICE (Howard Edward Horsman DAVIES and Violet Stewart Louise PIERCY), dyers and cleaners, 43, Marloes Road, Kensington, London, and 3a, FitzJohn Avenue, High Barnet, by mutual consent as from May 21, 1924. Debts received and paid by E. H. Davies.

Order Made on Application for Discharge

KEENE, Irvine Alexander, described in the Receiving Order as the Keene Company, 52, Gray's Inn Road, London, manufacturing chemists. (O.M.A.D., 7/6/24.) Date of Order, May 2, 1924. Discharged subject to judgment for £1 10s. (paid).

New Companies Registered

M. K. CARROLL, LTD., 3, Trafalgar Buildings, Bargoed. Manufacturing wholesale and retail pharmaceutical and analytical chemists. Nominal capital, £300 in £1 shares.

GOP (GETS OFF PAINT), LTD. Wholesale manufacturing chemists, analytical, synthetical and research chemists, paint and varnish makers, distillers, dyers, bleachers, etc. Nominal capital, £200 in £1 shares. Solicitors: Freeman, Haynes and Co., 11, Great James Street, Bedford Row, London, W.C.

HEYERDAHL PRODUCTS CO. (ENGLAND), LTD., 38, Regent Street, Cambridge. Manufacturers, refiners, shippers and blenders of cod liver oil or any other oil, etc. Nominal capital, £1,000 in 1s. shares.

IDEAL POLISH CO., LTD., Alexandra Works, Commercial Road, Newport. Manufacturers of polishes, etc. Nominal capital, £3,000 in £1 shares.

PLATINISING, LTD., Bank Chambers, 21, Old Bond Street, Bath, Somerset. To acquire a secret process for the platinising and rendering non-corrosive and rust-proof, and for plating iron and steel and other metals, etc. Nominal capital, £2,000 in £1 shares.

WILLIAM LACEY (LOUGHBOROUGH), LTD., Rendell Street, Loughborough. Dyers and finishers, makers of vitriol dyeing and bleaching materials, etc. Nominal capital, £50,000 in £1 shares.

Recent Wills

Dr. Guy Alfred Wyon, of Spring Road, Headingly, Leeds, lately lecturer in pathology at Leeds University, who, with the late Professor Moore, investigated T.N.T. poisoning and the means for its prevention £4,982

Mr. Albert Francis Wenger, of Victoria House, Newcastle-under-Lyme, founder and principal of Messrs Wengers, Ltd., ceramic and chemical manufacturers £96,964

Mr. Arthur Bradbury, Bryn Lupus, Llanrhos, Llandudno, late of Bradbury and Hirsch, and of Nene Sulphate Works Co. £118,487

Sir Harry Vernon Kilvert, The Lodge, Ashton-on-Mersey, a director of N. Kilvert and Sons, Ltd., lard refiners £145,798

Mr. Frederick George Adair Roberts, of North Gate, Regent's Park, London, vice-chairman of A. Boake, Roberts and Co., Ltd., manufacturing chemists £110,129

Books on Business.

THE McGraw-Hill Publishing Co., Ltd., have just issued a list of books on business and economics. The subjects covered include costing, industrial organisation, and scientific management in addition to the more general run of business matters of accounting, advertising, insurance and so on. The books are, of course, by American authors, but the list is well worth perusal, and will be forwarded to readers on application to the publishers at their London address: 6, Bouverie Street, E.C.4.

Flotation of Sulphur Ores

CONSIDERABLE work on the flotation of sulphur from the low-grade sulphur deposits in Beaver County, Utah, has been performed by the Interior Department at the Salt Lake City experiment station of the U.S.A. Bureau of Mines. Vast tonnages of low-grade sulphur, assaying from 15 to 30 per cent., exist, and it is necessary to beneficiate these ores in order to make the property commercially operative. It has been found that, by flotation, products assaying from 80 to 90 per cent. sulphur have been obtained with recoveries of the sulphur content averaging from 85 to 90 per cent. This operation makes it possible to treat the low-grade ores which without beneficiation would not be of particular value.